



west virginia department of environmental protection

Office of Oil and Gas
601 57th Street, S.E.
Charleston, WV 25304
(304) 926-0450
fax: (304) 926-0452

Austin Caperton, Cabinet Secretary
www.dep.wv.gov

Tuesday, March 17, 2020
WELL WORK PERMIT
Horizontal 6A / Drilling Deeper

TUG HILL OPERATING, LLC
380 SOUTHPOINTE BLVD

CANONSBURG, PA 15317


Re: Permit approval for HANSEN NO. 3H
47-051-01647-00-00

This well work permit is evidence of permission granted to perform the specified well work at the location described on the attached pages and located on the attached plat, subject to the provisions of Chapter 22 of the West Virginia Code of 1931, as amended, and all rules and regulations promulgated thereunder, and to any additional specific conditions and provisions outlined in the pages attached hereto. Notification shall be given by the operator to the Oil and Gas Inspector at least 24 hours prior to the construction of roads, locations, and/or pits for any permitted work. In addition, the well operator shall notify the same inspector 24 hours before any actual well work is commenced and prior to running and cementing casing. Spills or emergency discharges must be promptly reported by the operator to 1-800-642-3074 and to the Oil and Gas Inspector.

Please be advised that form WR-35, Well Operators Report of Well Work is to be submitted to this office within 90 days of completion of permitted well work, as should form WR-34 Discharge Monitoring Report within 30 days of discharge of pits, if applicable. Failure to abide by all statutory and regulatory provisions governing all duties and operations hereunder may result in suspension or revocation of this permit and, in addition, may result in civil and/or criminal penalties being imposed upon the operators.

Per 35 CSR 4-5.2.g this permit will expire in two (2) years from the issue date unless permitted well work is commenced. If there are any questions, please feel free to contact me at (304) 926- 0450.

James A. Martin
Chief

Operator's Well Number: HANSEN NO. 3H
Farm Name: BAYER MATERIAL SCIENCE 
U.S. WELL NUMBER: 47-051-01647-00-00
Horizontal 6A Drilling Deeper
Date Issued: 3/17/2020

PERMIT CONDITIONS

West Virginia Code § 22-6A-8(d) allows the Office of Oil and Gas to place specific conditions upon this permit. Permit conditions have the same effect as law. Failure to adhere to the specified permit conditions may result in enforcement action.

CONDITIONS

1. This proposed activity may require permit coverage from the United States Army Corps of Engineers (USACE). Through this permit, you are hereby being advised to consult with USACE regarding this proposed activity.
2. If the operator encounters an unanticipated void, or an anticipated void at an unanticipated depth, the operator shall notify the inspector within 24 hours. Modifications to the casing program may be necessary to comply with W. Va. Code § 22-6A-5a (12), which requires drilling to a minimum depth of thirty feet below the bottom of the void, and installing a minimum of twenty (20) feet of casing. Under no circumstance should the operator drill more than one hundred (100) feet below the bottom of the void or install less than twenty (20) feet of casing below the bottom of the void.
3. When compacting fills, each lift before compaction shall not be more than 12 inches in height, and the moisture content of the fill material shall be within limits as determined by the Standard Proctor Density test of the actual soils used in specific engineered fill, ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort, to achieve 95 % compaction of the optimum density. Each lift shall be tested for compaction, with a minimum of two tests per lift per acre of fill. All test results shall be maintained on site and available for review.
4. Operator shall install signage per § 22-6A-8g (6) (B) at all source water locations included in their approved water management plan within 24 hours of water management plan activation.
5. Oil and gas water supply wells will be registered with the Office of Oil and Gas and all such wells will be constructed and plugged in accordance with the standards of the Bureau for Public Health set forth in its Legislative rule entitled *Water Well Regulations*, 64 C.S.R. 19. Operator is to contact the Bureau of Public Health regarding permit requirements. In lieu of plugging, the operator may transfer the well to the surface owner upon agreement of the parties. All drinking water wells within fifteen hundred feet of the water supply well shall be flow tested by the operator upon request of the drinking well owner prior to operating the water supply well.
6. Pursuant to the requirements pertaining to the sampling of domestic water supply wells/springs the operator shall, no later than thirty (30) days after receipt of analytical data provide a written copy to the Chief and any of the users who may have requested such analyses.
7. 24 hours prior to the initiation of the completion process the operator shall notify the Chief or his designee.
8. During the completion process the operator shall monitor annular pressures and report any anomaly noticed to the chief or his designee immediately.
9. If any explosion or other accident causing loss of life or serious personal injury occurs in or about a well or well work on a well, the well operator or its contractor shall give notice, stating the particulars of the explosion or accident, to the oil and gas inspector and the Chief, within 24 hours of said accident.
10. During the casing and cementing process, in the event cement does not return to the surface, the oil and gas inspector shall be notified within 24 hours.

PERMIT CONDITIONS

11. The operator shall provide to the Office of Oil and Gas the dates of each of the following within 30 days of their occurrence: completion of construction of the well pad, commencement of drilling, cessation of drilling, completion of any other permitted well work, and completion of the well. Such notice shall be provided by sending an email to DEPOOGNotify@wv.gov.



west virginia department of environmental protection

Oil and Gas Conservation Commission
601 57th Street SE, Charleston, WV 25304
304-926-0499 Ext 1274

Barry K. Lay, Chairman
dep.wv.gov

October 9, 2019

Department of Environmental Protection
Office of Oil and Gas
Charleston, WV 25304

RE: Application for Deep Well Permit – API #47-051-01647

COMPANY: Tug Hill Operating, LLC

FARM: Covestro, LLC Hansen 3HU

COUNTY: Marshall DISTRICT: Franklin QUAD: New Martinsville

The deep well review of the application for the above company is Approved to drill to Trenton for Point Pleasant completion.

The applicant has complied with the provision of Chapter 22C-9, of the Code of West Virginia, nineteen hundred and thirty-one (1931), as amended, Oil and Gas Conservation Commission as follows:

1. Comments to Notice of Deviation filed? No
2. Provided a certified copy of duly acknowledged and recorded consent and easement form from all surface owners? Yes
3. Provided a tabulation of all deep wells within one mile of the proposed location, including the API number of all deep wells: : **yes; Docket 288-268 Exception Location Hearing
4. Provided a plat showing that the proposed location is a distance of 400+ feet from the nearest lease line or unit boundary with the exception of the toe which is 10 feet from the nearest lease line or unit boundary and showing the following wells drilled to or capable of producing from the objective formation within 3,000 feet of the proposed location.

Sincerely,

A handwritten signature in blue ink that reads "Susan Rose".

Susan Rose
Administrator

** Blake U-7H 47-051-01766, Blake N-9HU 47-051-02203, Armstrong 1N-13HU 47-051-02259, Armstrong 1N-14HU 47-051-02260, Armstrong 1S-10HU 47-051-02256, Armstrong 1S-11HU 47-051-02257, Armstrong 1S-12HU 47-051-02258, Hansen N-2HU 47-051-02174,

* Drill Deeper

Hansen N-4HU 47-051-02175, Hansen S-6HU 47-051-02176, Hansen S-7HU 47-051-01654, Hansen S-8HU 47-051-02177, and Burch Ridge S-6HU 47-051-02193, Burch Ridge S-7HU 47-051-02194, Greer 1N-5HU 47-051-01893, Greer 1N-10HU 47-051-01894, Greer 1N-11HU 47-051-01895, Greer 1N-12HU 47-051-01896, Eagle Natrium #28 47-051-01381, Eagle Natrium #8 47-051-00310, Eagle Natrium #9 47-051-00313, Eagle Natrium #11 47-051-00523, Eagle Natrium #35 47-051-00562, Goudy 1N-12HU 47-051-02261, Goudy 1N-13HU 47-051-02198, Goudy 1N-14HU 47-051-02199, Goudy 1N-15HU 47-051-02200, Goudy 1S-16HU 47-051-02195, Goudy 1S-17HU 47-051-02196, Goudy 1S-18HU 47-051-02197

WW-6B
(04/15)

API NO. 47-051 - 01647 DD
OPERATOR WELL NO. Hansen 3HU
Well Pad Name: Hansen

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
WELL WORK PERMIT APPLICATION

1) Well Operator: Tug Hill Operating, LLC 494510851 Marshall Franklin New Martinsville ⁷
Operator ID County District Quadrangle

2) Operator's Well Number: Hansen 3HU Well Pad Name: Hansen

3) Farm Name/Surface Owner: Covestro LLC, FKA Bayer Material Science, LLC Public Road Access: County Route 2/2 - Wells Hill Road

4) Elevation, current ground: 1,247' Elevation, proposed post-construction: 1,247'

5) Well Type (a) Gas Oil _____ Underground Storage _____
Other _____

(b) If Gas Shallow _____ Deep
Horizontal X Drill Deeper

MW
2/14/2020

6) Existing Pad: Yes or No Yes

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Point Pleasant is the target formation at a depth of 11,129' - 11,248' thickness of 119' and anticipated pressure of approx. 9,500 psi

8) Proposed Total Vertical Depth: 11,398'

9) Formation at Total Vertical Depth: Trenton, plug back to Reedsville

10) Proposed Total Measured Depth: 24,425'

11) Proposed Horizontal Leg Length: 12,693.80'

12) Approximate Fresh Water Strata Depths: 848'

13) Method to Determine Fresh Water Depths: Offset well reports or noticeable flow at the flowline or when need to start soaping

14) Approximate Saltwater Depths: 1,740'

15) Approximate Coal Seam Depths: Sewickly Coal - 758' and Pittsburgh Coal - 843'

16) Approximate Depth to Possible Void (coal mine, karst, other): None anticipated

17) Does Proposed well location contain coal seams directly overlying or adjacent to an active mine? Yes _____ No

(a) If Yes, provide Mine Info: Name: _____
Depth: _____
Seam: _____
Owner: _____

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18) CASING AND TUBING PROGRAM

TYPE	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu. Ft.)/CTS
Conductor	20"	Existing	BW	94	n/a	120'	Existing ✓
Fresh Water	13 3/8"	Existing	H40	48	n/a	1,219'	Existing ✓
Coal	9 5/8"	Existing	J55	36	n/a	2,632'	Existing ✓
Intermediate	7"	NEW	HPP110	26	10,216'	10,216'	1,610 Ft^3(CTS)
Production	4.5"	NEW	HPP110	13.5	24,425'	24,425'	2,287 Ft^3(CTS)
Tubing	2 3/8"	NEW				11,299'	
Liners							

Ju
7/8/19

TYPE	Size (in)	Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)	Anticipated Max. Internal Pressure (psi)	Cement Type	Cement Yield (cu. ft./k)
Conductor	20"	Existing	.438	1,530	1,224	Existing	Existing
Fresh Water	13 3/8"	Existing	.380	2,740	2,192	Existing	Existing
Coal	9 5/8"	Existing	.352	3,520	2,816	Existing	Existing
Intermediate	7"	8.875"	.362	11,320	9,056	See #24	1.99
Production	4 1/2"	6.00"	.290	14,110	11,288	See #24	1.19
Tubing	2 3/8"			14,850	11,880		
Liners							

PACKERS

Kind:	N/A			
Sizes:	N/A			
Depths Set:	N/A			

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WW-6B
(10/14)

API NO. 47- 051 - 01647 DD
OPERATOR WELL NO. Hansen 3HU
Well Pad Name: Hansen

Handwritten signature and date: 2/4/2020

19) Describe proposed well work, including the drilling and plugging back of any pilot hole:

Modify direction of well bore:
Plug back open hole with solid cement plug up into the 9.625" casing to stabilize well bore.

Drill through cement and modify direction:
Drill out cement below previous casing set depth (approximately 150' in original hole) until separation from 9.625" casing is gained and cement/formation properties are conducive to sidetracking operations. Perform open-hole sidetrack, gain separation from the original wellbore and drill to TD per directional plan attached. Planned TD is through the Point Pleasant and 150' into the Trenton formation. Log vertical section and set a solid cement plug back to proposed KOP (approximately 10,799' in the new wellbore). Drill curve and lateral per proposed well plan, run and cement production casing. Perform CBL from 60 deg to surface, make cleanout run, and stimulate.

20) Describe fracturing/stimulating methods in detail, including anticipated max pressure and max rate:

Well to be completed with approximately 31,727,500 lb proppant and 490,530 bbl of water. Max rate = 80 bpm; max psi = 9,000#.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 28.28

22) Area to be disturbed for well pad only, less access road (acres): 6.22

23) Describe centralizer placement for each casing string:

Will run 3 centralizers on surface casing at equal distance. Intermediate will have 1 centralizer every other joint. Production casing will have one centralizer every other joint in lateral, one centralizer every joint through curve, one centralizer every other joint to surface.

24) Describe all cement additives associated with each cement type:

*See Attachment

25) Proposed borehole conditioning procedures:

Will circulate a minimum of 3 hours at TD, short trip to curve, circulate bottoms up, check for flow, POOH

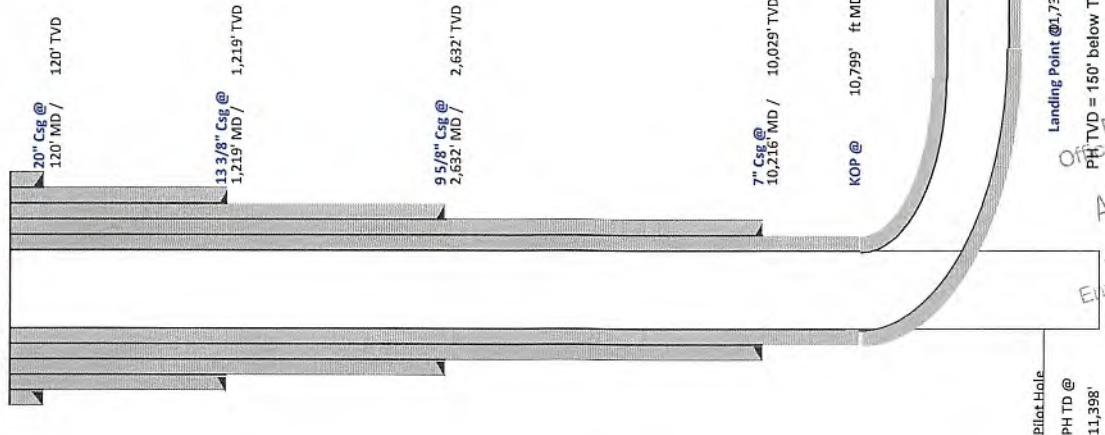
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*Note: Attach additional sheets as needed.

4705101647 DD



WELL NAME: Hansen 3HU
 STATE: WV COUNTY: Marshall
 DISTRICT: Franklin
 DF Elev: 1,247' GL Elev: 1,247'
 TD: 24,425'
 TH Latitude: 39.72665688
 TH Longitude: -80.81428531
 BH Latitude: 93.759869
 BH Longitude: -80.833731



CASING SUMMARY

Type	Hole Size (in)	Csg Size (in)	Depth (MD)	Depth (TVD)	Weight (lb/ft)	Grade	Top of Cemen
Conductor	26	20	120'	120'	BW	BW	Surface
Surface	17.5	13.375	1,219'	1,219'	48	H40	Surface
Intermediate 1	12 1/4	9 5/8	2,632'	2,632'	36	J55	Surface
Intermediate 2	8 7/8	7	10,029'	10,029'	26	HPP110	Surface
Production	6	4 1/2	24,425'	10,958'	13.5	HCP110	Surface

CEMENT SUMMARY

Sucks	Class	Density	Fluid Type	Centralizer Notes
222	A	15.6	Air	None
934	A	15.6	Air	3 Centralizers at equal distance
902	A	15	Air	1 Centralizer every other jt
1,376	A	14.5	Air	1 Centralizer every other jt
2,027	A	15	Air / SOBM	1 every other joint in lateral; 1 per joint in curve; 1 every other jt to sfc

FORMATION TOPS

Formation	Depth TVD
Deepest Fresh Water	848'
Sewickley Coal	758'
Pittsburgh Coal	843'
Big Lime	2,044'
Berea	2,587'
Tully	6,439'
Marcellus	6,498'
Onondaga	6,550'
Salina	7,201'
Lockport	8,223'
Utica	10,876'
Point Pleasant	11,129'
Landing Depth	11,179'
Trenton	11,248'
Pilot Hole TD	11,398'

Handwritten signature and date: 7/8/19

Lateral TD @ 24,425' ft MD
 10,958 ft TVD

Landing Point @ 1,734' MD / 11,179' TVD
 PH TD = 150' below Trenton Top

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Pilot Hole
 PH TD @ 11,398'

20" Csg @ 120' MD / 120' TVD
 13 3/8" Csg @ 1,219' MD / 1,219' TVD
 9 5/8" Csg @ 2,632' MD / 2,632' TVD
 7" Csg @ 10,216' MD / 10,029' TVD
 KOP @ 10,799' ft MD

4705101647DD



Tug Hill Operating, LLC Casing and Cement Program

Hansen 3HU

Casing

	String	Grade	Bit Size	Depth (Measured)	Cement Fill Up
Conductor	20"	BW	26"	120'	CTS
Surface	13 3/8"	H40	17 1/2"	1,219'	CTS
Intermediate 1	9 5/8"	J55	12 1/4"	2,632'	CTS
Intermediate 2	7"	HPP110	8 7/8"	10,216'	CTS
Production	4 1/2"	HCP110	6"	24,425'	CTS

Cement

Surface: Premium NE-1 + 2% bwoc CaC12 + 46.5% Fresh Water – Surface Cement mixed at 15.6 ppg, Y=1.2

Intermediate 1: Premium NE-1 + 1% bwoc CaC12 + 46.5% Fresh Water – Intermediate Cement mixed at 15.6 ppg, Y=1.2

Intermediate 2: Premium NE-1 + 1% bwoc CaC12 + 46.5% Fresh Water – Intermediate Cement mixed at 15.6 ppg, Y=1.99

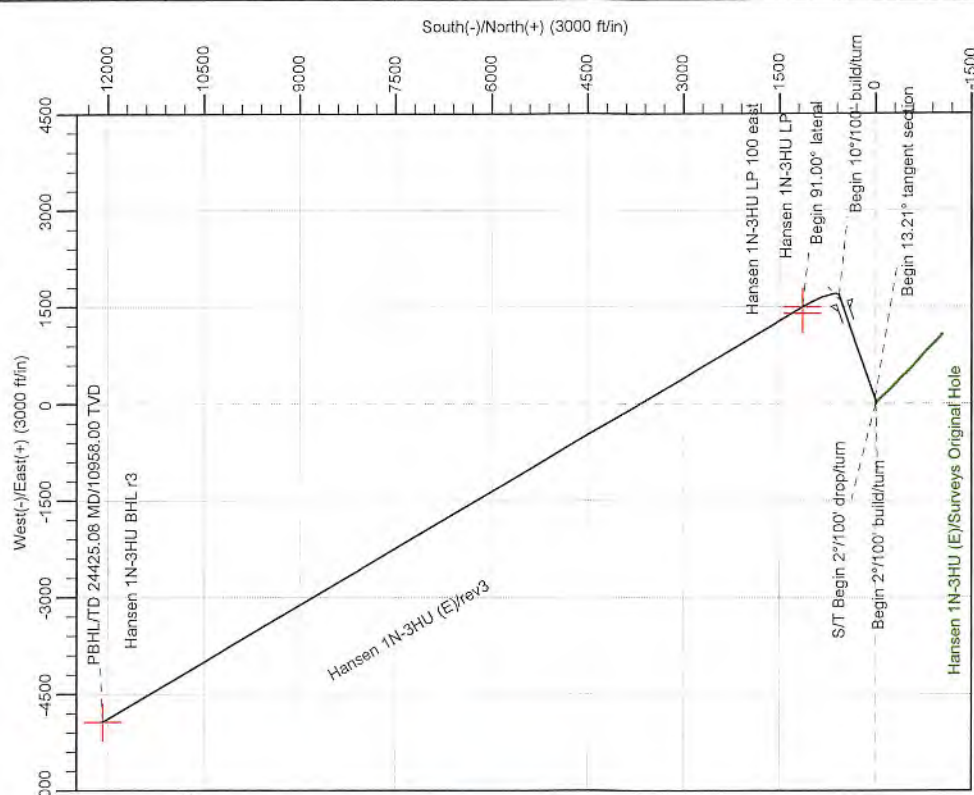
Production: 50:50 Poz: Premium NE-1 + .1% bwoc ASA-301 + 60lb/sk ASCA-1 + .35% bwoc BA-10A + .25% bwoc MPA-170, 44 lb sack + .5% bwoc R-3 + .75 gals/100sk FP-13L – Production Cement mixed at 15.2ppg, Y = 1.18

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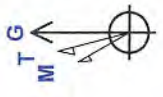
TUG HILL OPERATING
Well: Hansen 1N-3HU (E)
Site: Hansen
Project: Wetzel County, West Virginia (UTM17 NAD83)
Design: rev3

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Annotation
1	2835.01	5.57	116.91	2834.77	-2.97	5.47	0.00	0.000	-5.19	S/T Begin 2'100' droplum
2	2935.01	4.39	98.10	2934.40	-5.70	14.59	2.00	-135.000	-10.79	Begin 2'100' buildlum
3	3411.52	13.21	70.58	3405.00	9.86	84.14	2.00	-38.609	-22.64	Begin 13.21° tangent section
4	10798.89	13.21	70.58	10595.93	570.97	1676.16	0.00	0.000	-104.26	Begin 10'100' buildlum
5	11733.64	91.00	329.57	11179.02	1142.08	1499.07	10.00	-100.505	491.44	Begin 91.00° lateral
6	24425.08	91.00	329.57	10958.00	12083.69	-4927.83	0.00	0.000	3049.87	PBHL/TD 24425.08 MD/10958.00 TVD



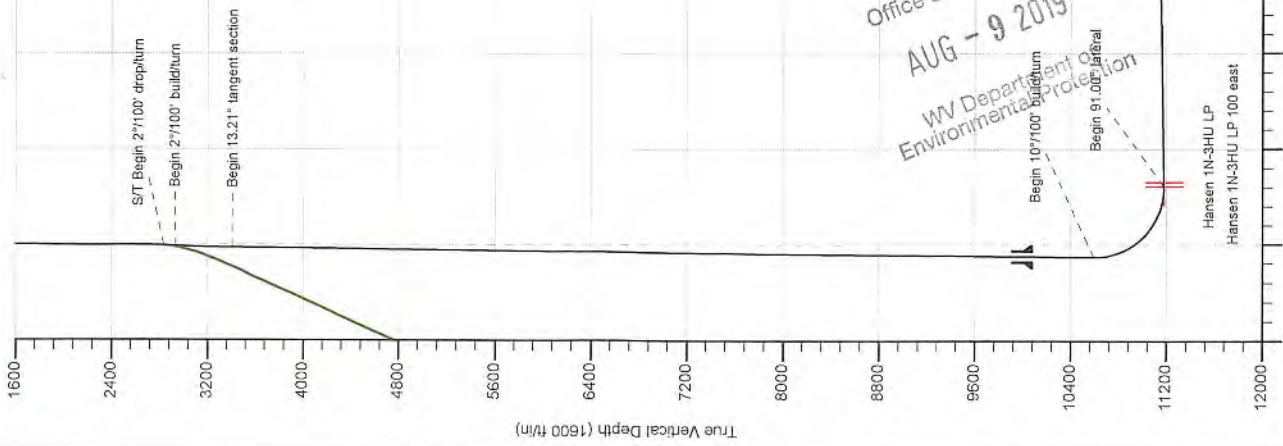
Geodetic System: Universal Transverse Mercator (US Survey Feet)
 Datum: NAD83 West Virginia - HARN
 Ellipsoid: GRS 1980
 Zone: Zone 17N (84 W to 78 W)
 System Datum: Mean Sea Level
 Depth Reference: GL=1247 @ 1247.00ft
 Northing: 14427254.64
 Easting: 1692633.04
 Longitude: -90.81428531
 Total Corr (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.784°



Azimuths to Grid North
 True North: -0.12°
 Magnetic North: -8.78°
 Magnetic Field
 Strength: 51927.85nT
 Dip Angle: 66.76°
 Date: 6/6/2019
 Model: IGRF2015



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Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Hansen 1N-3HU (E)
Company:	Tug Hill Operating LLC	TVD Reference:	GL=1247 @ 1247.00ft
Project:	Wetzel County, West Virginia (UTM17 NAD83)	MD Reference:	GL=1247 @ 1247.00ft
Site:	Hansen	North Reference:	Grid
Well:	Hansen 1N-3HU (E)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Sidetrack 01		
Design:	rev3		

Project	Wetzel County, West Virginia (UTM17 NAD83)		
Map System:	Universal Transverse Mercator (US Survey Feet)	System Datum:	Mean Sea Level
Geo Datum:	NAD83 West Virginia - HARN		
Map Zone:	Zone 17N (84 W to 78 W)		

Site	Hansen				
Site Position:		Northing:	14,427,333.87 usft	Latitude:	39.72687441
From:	Lat/Long	Easting:	1,692,643.93 usft	Longitude:	-80.81424599
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "	Grid Convergence:	0.119 °

Well	Hansen 1N-3HU (E)					
Well Position	+N/-S	0.00 ft	Northing:	14,427,254.64 usft	Latitude:	39.72665688
	+E/-W	0.00 ft	Easting:	1,692,633.04 usft	Longitude:	-80.81428531
Position Uncertainty		0.00 ft	Wellhead Elevation:	0.00 ft	Ground Level:	1,247.00 ft

Wellbore	Sidetrack 01				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	6/6/2019	-8.666	66.759	51,927.84697659

Design	rev3			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	2,835.01
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.00	0.00	0.00	337.81

Plan Survey Tool Program	Date	6/4/2019		
Depth From (ft)	Depth To (ft)	Survey (Wellbore)	Tool Name	Remarks
1	2,835.01	24,425.08 rev3 (Sidetrack 01)	MWD	MWD - Standard

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)
2,835.01	5.57	116.91	2,834.77	-2.97	6.47	0.00	0.00	0.00	0.000
2,935.01	4.39	98.10	2,934.40	-5.70	14.59	2.00	-1.18	-18.81	-135.000
3,411.52	13.21	70.58	3,405.00	9.86	84.14	2.00	1.85	-5.77	-39.609
10,798.89	13.21	70.58	10,596.93	570.97	1,676.16	0.00	0.00	0.00	0.000
11,733.64	91.00	329.57	11,179.02	1,142.08	1,499.07	10.00	8.32	-10.81	-100.505
24,425.08	91.00	329.57	10,958.00	12,083.69	-4,927.83	0.00	0.00	0.00	0.000

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Hansen 1N-3HU LP 1
Hansen 1N-3HU BHL



Database: DB_Jul2216dt_v14
 Company: Tug Hill Operating LLC
 Project: Watzel County, West Virginia (UTM17 NAD83)
 Site: Hansen
 Well: Hansen 1N-3HU (E)
 Wellbore: Sidetrack 01
 Design: rev3

Local Co-ordinate Reference: Well Hansen 1N-3HU (E)
 TVD Reference: GL=1247 @ 1247.00ft
 MD Reference: GL=1247 @ 1247.00ft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature

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Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
2,835.01	5.57	116.91	2,834.77	-2.97	6.47	14,427,251.67	1,692,639.51	39.72664869	-80.81426232
S/T Begin 2°/100' drop/turn									
2,900.00	4.74	105.72	2,899.50	-5.12	11.87	14,427,249.52	1,692,644.91	39.72664274	-80.81424314
2,935.01	4.39	98.10	2,934.40	-5.70	14.59	14,427,248.94	1,692,647.63	39.72664113	-80.81423348
Begin 2°/100' build/turn									
3,000.00	5.45	89.35	2,999.15	-6.02	20.14	14,427,248.62	1,692,653.18	39.72664024	-80.81421374
3,100.00	7.24	81.18	3,098.54	-5.00	31.12	14,427,249.64	1,692,664.16	39.72664298	-80.81417467
3,200.00	9.12	76.29	3,197.52	-2.15	45.05	14,427,252.49	1,692,678.09	39.72665072	-80.81412511
3,300.00	11.04	73.07	3,295.97	2.52	61.91	14,427,257.16	1,692,694.95	39.72666344	-80.81406510
3,400.00	12.98	70.80	3,393.78	9.00	81.68	14,427,263.64	1,692,714.72	39.72668113	-80.81399474
3,411.52	13.21	70.58	3,405.00	9.86	84.14	14,427,264.50	1,692,717.19	39.72668348	-80.81398597
Begin 13.21° tangent section									
3,500.00	13.21	70.58	3,491.14	16.58	103.21	14,427,271.22	1,692,736.25	39.72670183	-80.81391810
3,600.00	13.21	70.58	3,588.49	24.18	124.76	14,427,278.82	1,692,757.80	39.72672257	-80.81384140
3,700.00	13.21	70.58	3,685.85	31.77	146.31	14,427,286.41	1,692,779.35	39.72674330	-80.81376470
3,800.00	13.21	70.58	3,783.20	39.37	167.86	14,427,294.01	1,692,800.90	39.72676404	-80.81368800
3,900.00	13.21	70.58	3,880.55	46.96	189.41	14,427,301.60	1,692,822.46	39.72678478	-80.81361129
4,000.00	13.21	70.58	3,977.91	54.56	210.96	14,427,309.20	1,692,844.01	39.72680551	-80.81353459
4,100.00	13.21	70.58	4,075.26	62.15	232.51	14,427,316.80	1,692,865.56	39.72682625	-80.81345789
4,200.00	13.21	70.58	4,172.62	69.75	254.07	14,427,324.39	1,692,887.11	39.72684699	-80.81338118
4,300.00	13.21	70.58	4,269.97	77.35	275.62	14,427,331.99	1,692,908.66	39.72686772	-80.81330448
4,400.00	13.21	70.58	4,367.33	84.94	297.17	14,427,339.58	1,692,930.21	39.72688846	-80.81322778
4,500.00	13.21	70.58	4,464.68	92.54	318.72	14,427,347.18	1,692,951.76	39.72690920	-80.81315107
4,600.00	13.21	70.58	4,562.04	100.13	340.27	14,427,354.77	1,692,973.31	39.72692993	-80.81307437
4,700.00	13.21	70.58	4,659.39	107.73	361.82	14,427,362.37	1,692,994.86	39.72695067	-80.81299767
4,800.00	13.21	70.58	4,756.74	115.32	383.37	14,427,369.96	1,693,016.41	39.72697140	-80.81292096
4,900.00	13.21	70.58	4,854.10	122.92	404.92	14,427,377.56	1,693,037.96	39.72699214	-80.81284426
5,000.00	13.21	70.58	4,951.45	130.51	426.47	14,427,385.16	1,693,059.51	39.72701288	-80.81276756
5,100.00	13.21	70.58	5,048.81	138.11	448.02	14,427,392.75	1,693,081.06	39.72703361	-80.81269085
5,200.00	13.21	70.58	5,146.16	145.71	469.57	14,427,400.35	1,693,102.61	39.72705435	-80.81261415
5,300.00	13.21	70.58	5,243.52	153.30	491.12	14,427,407.94	1,693,124.16	39.72707509	-80.81253744
5,400.00	13.21	70.58	5,340.87	160.90	512.67	14,427,415.54	1,693,145.71	39.72709582	-80.81246074
5,500.00	13.21	70.58	5,438.22	168.49	534.22	14,427,423.13	1,693,167.26	39.72711656	-80.81238404
5,600.00	13.21	70.58	5,535.58	176.09	555.77	14,427,430.73	1,693,188.81	39.72713729	-80.81230733
5,700.00	13.21	70.58	5,632.93	183.68	577.32	14,427,438.32	1,693,210.36	39.72715803	-80.81223063
5,800.00	13.21	70.58	5,730.29	191.28	598.87	14,427,445.92	1,693,231.91	39.72717876	-80.81215393
5,900.00	13.21	70.58	5,827.64	198.87	620.42	14,427,453.52	1,693,253.46	39.72719950	-80.81207722
6,000.00	13.21	70.58	5,925.00	206.47	641.97	14,427,461.11	1,693,275.01	39.72722024	-80.81200052
6,100.00	13.21	70.58	6,022.35	214.07	663.53	14,427,468.71	1,693,296.57	39.72724097	-80.81192381
6,200.00	13.21	70.58	6,119.71	221.66	685.08	14,427,476.30	1,693,318.12	39.72726171	-80.81184711
6,300.00	13.21	70.58	6,217.06	229.26	706.63	14,427,483.90	1,693,339.67	39.72728244	-80.81177040
6,400.00	13.21	70.58	6,314.41	236.85	728.18	14,427,491.49	1,693,361.22	39.72730318	-80.81169370
6,500.00	13.21	70.58	6,411.77	244.45	749.73	14,427,499.09	1,693,382.77	39.72732391	-80.81161700
6,600.00	13.21	70.58	6,509.12	252.04	771.28	14,427,506.68	1,693,404.32	39.72734465	-80.81154029
6,700.00	13.21	70.58	6,606.48	259.64	792.83	14,427,514.28	1,693,425.87	39.72736538	-80.81146359
6,800.00	13.21	70.58	6,703.83	267.23	814.38	14,427,521.87	1,693,447.42	39.72738612	-80.81138688
6,900.00	13.21	70.58	6,801.19	274.83	835.93	14,427,529.47	1,693,468.97	39.72740685	-80.81131018
7,000.00	13.21	70.58	6,898.54	282.43	857.48	14,427,537.07	1,693,490.52	39.72742759	-80.81123347
7,100.00	13.21	70.58	6,995.90	290.02	879.03	14,427,544.66	1,693,512.07	39.72744832	-80.81115677
7,200.00	13.21	70.58	7,093.25	297.62	900.58	14,427,552.26	1,693,533.62	39.72746906	-80.81108006
7,300.00	13.21	70.58	7,190.60	305.21	922.13	14,427,559.85	1,693,555.17	39.72748979	-80.81100336
7,400.00	13.21	70.58	7,287.96	312.81	943.68	14,427,567.45	1,693,576.72	39.72751053	-80.81092666
7,500.00	13.21	70.58	7,385.31	320.40	965.23	14,427,575.04	1,693,598.27	39.72753126	-80.81084995



Planning Report - Geographic

4705101647 DD

Database: DB_Jul2216dt_v14
 Company: Tug Hill Operating LLC
 Project: Wetzel County, West Virginia (UTM17 NAD83)
 Site: Hansen
 Well: Hansen 1N-3HU (E)
 Wellbore: Sidetrack 01
 Design: rev3

Local Co-ordinate Reference: Well Hansen 1N-3HU (E)
 TVD Reference: GL=1247 @ 1247.00ft
 MD Reference: GL=1247 @ 1247.00ft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature

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 AUG - 9 2019
 WV Department of
 Environmental Protection

Planned Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
7,600.00	13.21	70.58	7,482.67	328.00	986.78	14,427,582.64	1,693,619.82	39.72755200	-80.81077325	
7,700.00	13.21	70.58	7,580.02	335.59	1,008.33	14,427,590.23	1,693,641.37	39.72757273	-80.81069654	
7,800.00	13.21	70.58	7,677.38	343.19	1,029.88	14,427,597.83	1,693,662.92	39.72759347	-80.81061984	
7,900.00	13.21	70.58	7,774.73	350.79	1,051.43	14,427,605.43	1,693,684.47	39.72761420	-80.81054313	
8,000.00	13.21	70.58	7,872.09	358.38	1,072.98	14,427,613.02	1,693,706.02	39.72763494	-80.81046643	
8,100.00	13.21	70.58	7,969.44	365.98	1,094.54	14,427,620.62	1,693,727.57	39.72765567	-80.81038972	
8,200.00	13.21	70.58	8,066.79	373.57	1,116.09	14,427,628.21	1,693,749.13	39.72767641	-80.81031302	
8,300.00	13.21	70.58	8,164.15	381.17	1,137.64	14,427,635.81	1,693,770.68	39.72769714	-80.81023631	
8,400.00	13.21	70.58	8,261.50	388.76	1,159.19	14,427,643.40	1,693,792.23	39.72771787	-80.81015961	
8,500.00	13.21	70.58	8,358.86	396.36	1,180.74	14,427,651.00	1,693,813.78	39.72773861	-80.81008290	
8,600.00	13.21	70.58	8,456.21	403.95	1,202.29	14,427,658.59	1,693,835.33	39.72775934	-80.81000620	
8,700.00	13.21	70.58	8,553.57	411.55	1,223.84	14,427,666.19	1,693,856.88	39.72778008	-80.80992949	
8,800.00	13.21	70.58	8,650.92	419.15	1,245.39	14,427,673.79	1,693,878.43	39.72780081	-80.80985278	
8,900.00	13.21	70.58	8,748.28	426.74	1,266.94	14,427,681.38	1,693,899.98	39.72782155	-80.80977608	
9,000.00	13.21	70.58	8,845.63	434.34	1,288.49	14,427,688.98	1,693,921.53	39.72784228	-80.80969937	
9,100.00	13.21	70.58	8,942.98	441.93	1,310.04	14,427,696.57	1,693,943.08	39.72786301	-80.80962267	
9,200.00	13.21	70.58	9,040.34	449.53	1,331.59	14,427,704.17	1,693,964.63	39.72788375	-80.80954596	
9,300.00	13.21	70.58	9,137.69	457.12	1,353.14	14,427,711.76	1,693,986.18	39.72790448	-80.80946926	
9,400.00	13.21	70.58	9,235.05	464.72	1,374.69	14,427,719.36	1,694,007.73	39.72792522	-80.80939255	
9,500.00	13.21	70.58	9,332.40	472.31	1,396.24	14,427,726.95	1,694,029.28	39.72794595	-80.80931585	
9,600.00	13.21	70.58	9,429.76	479.91	1,417.79	14,427,734.55	1,694,050.83	39.72796668	-80.80923914	
9,700.00	13.21	70.58	9,527.11	487.51	1,439.34	14,427,742.15	1,694,072.38	39.72798742	-80.80916243	
9,800.00	13.21	70.58	9,624.47	495.10	1,460.89	14,427,749.74	1,694,093.93	39.72800815	-80.80908573	
9,900.00	13.21	70.58	9,721.82	502.70	1,482.44	14,427,757.34	1,694,115.48	39.72802888	-80.80900902	
10,000.00	13.21	70.58	9,819.17	510.29	1,503.99	14,427,764.93	1,694,137.03	39.72804962	-80.80893232	
10,100.00	13.21	70.58	9,916.53	517.89	1,525.55	14,427,772.53	1,694,158.58	39.72807035	-80.80885561	
10,200.00	13.21	70.58	10,013.88	525.48	1,547.10	14,427,780.12	1,694,180.13	39.72809108	-80.80877891	
10,300.00	13.21	70.58	10,111.24	533.08	1,568.65	14,427,787.72	1,694,201.68	39.72811182	-80.80870220	
10,400.00	13.21	70.58	10,208.59	540.67	1,590.20	14,427,795.31	1,694,223.24	39.72813255	-80.80862549	
10,500.00	13.21	70.58	10,305.95	548.27	1,611.75	14,427,802.91	1,694,244.79	39.72815328	-80.80854879	
10,600.00	13.21	70.58	10,403.30	555.87	1,633.30	14,427,810.51	1,694,266.34	39.72817402	-80.80847208	
10,700.00	13.21	70.58	10,500.65	563.46	1,654.85	14,427,818.10	1,694,287.89	39.72819475	-80.80839537	
10,798.89	13.21	70.58	10,596.93	570.97	1,676.16	14,427,825.61	1,694,309.20	39.72821525	-80.80831952	
Begin 10°/100' build/turn										
10,800.00	13.19	70.11	10,598.01	571.06	1,676.40	14,427,825.70	1,694,309.44	39.72821549	-80.80831867	
10,900.00	15.04	28.89	10,695.22	586.34	1,693.44	14,427,840.98	1,694,326.48	39.72825735	-80.80825795	
11,000.00	21.80	5.01	10,790.18	616.27	1,701.35	14,427,870.91	1,694,334.39	39.72833951	-80.80822958	
11,100.00	30.34	353.00	10,879.99	659.94	1,699.89	14,427,914.58	1,694,332.93	39.72845945	-80.80823444	
11,200.00	39.52	346.03	10,961.92	716.03	1,689.11	14,427,970.66	1,694,322.15	39.72861354	-80.80827237	
11,300.00	48.98	341.37	11,033.48	782.82	1,669.33	14,428,037.46	1,694,302.36	39.72879709	-80.80834222	
11,400.00	58.58	337.90	11,092.51	858.29	1,641.15	14,428,112.93	1,694,274.19	39.72900453	-80.80844186	
11,500.00	68.26	335.08	11,137.21	940.15	1,605.43	14,428,194.79	1,694,238.47	39.72922955	-80.80856828	
11,600.00	77.98	332.61	11,166.21	1,025.91	1,563.25	14,428,280.55	1,694,196.29	39.72946532	-80.80871764	
11,700.00	87.72	330.33	11,178.65	1,112.97	1,515.91	14,428,367.61	1,694,148.95	39.72970467	-80.80888538	
11,733.64	91.00	329.57	11,179.02	1,142.08	1,499.06	14,428,396.72	1,694,132.10	39.72978472	-80.80894506	
Begin 91.00° lateral										
11,800.00	91.00	329.57	11,177.87	1,199.29	1,465.46	14,428,453.93	1,694,098.50	39.72994204	-80.80906415	
11,900.00	91.00	329.57	11,176.13	1,285.50	1,414.82	14,428,540.14	1,694,047.86	39.73017910	-80.80924361	
12,000.00	91.00	329.57	11,174.38	1,371.71	1,364.18	14,428,626.35	1,693,997.22	39.73041616	-80.80942308	
12,100.00	91.00	329.57	11,172.64	1,457.93	1,313.54	14,428,712.56	1,693,946.58	39.73065322	-80.80960254	
12,200.00	91.00	329.57	11,170.90	1,544.14	1,262.90	14,428,798.78	1,693,895.94	39.73089028	-80.80978201	
12,300.00	91.00	329.57	11,169.16	1,630.35	1,212.26	14,428,884.99	1,693,845.30	39.73112734	-80.80996147	
12,400.00	91.00	329.57	11,167.42	1,716.56	1,161.62	14,428,971.20	1,693,794.66	39.73136440	-80.81014094	



Planning Report - Geographic

4705101647 DD

Database: DB_Jul2216dt_v14
 Company: Tug Hill Operating LLC
 Project: Wetzel County, West Virginia (UTM17 NAD83)
 Site: Hansen
 Well: Hansen 1N-3HU (E)
 Wellbore: Sidetrack 01
 Design: rev3

Local Co-ordinate Reference: Well Hansen 1N-3HU (E)
 TVD Reference: GL=1247 @ 1247.00ft
 MD Reference: GL=1247 @ 1247.00ft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature

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WV Department of
 Environmental Protection

Planned Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
12,500.00	91.00	329.57	11,165.68	1,802.78	1,110.98	14,429,057.41	1,693,744.02	39.73160146	-80.81032041	
12,600.00	91.00	329.57	11,163.93	1,888.99	1,060.34	14,429,143.63	1,693,693.38	39.73183852	-80.81049988	
12,700.00	91.00	329.57	11,162.19	1,975.20	1,009.70	14,429,229.84	1,693,642.74	39.73207558	-80.81067935	
12,800.00	91.00	329.57	11,160.45	2,061.41	959.06	14,429,316.05	1,693,592.10	39.73231264	-80.81085882	
12,900.00	91.00	329.57	11,158.71	2,147.63	908.42	14,429,402.26	1,693,541.46	39.73254970	-80.81103830	
13,000.00	91.00	329.57	11,156.97	2,233.84	857.79	14,429,488.48	1,693,490.83	39.73278676	-80.81121777	
13,100.00	91.00	329.57	11,155.23	2,320.05	807.15	14,429,574.69	1,693,440.19	39.73302381	-80.81139725	
13,200.00	91.00	329.57	11,153.49	2,406.26	756.51	14,429,660.90	1,693,389.55	39.73326087	-80.81157672	
13,300.00	91.00	329.57	11,151.74	2,492.48	705.87	14,429,747.11	1,693,338.91	39.73349793	-80.81175620	
13,400.00	91.00	329.57	11,150.00	2,578.69	655.23	14,429,833.33	1,693,288.27	39.73373499	-80.81193568	
13,500.00	91.00	329.57	11,148.26	2,664.90	604.59	14,429,919.54	1,693,237.63	39.73397204	-80.81211516	
13,600.00	91.00	329.57	11,146.52	2,751.11	553.95	14,430,005.75	1,693,186.99	39.73420910	-80.81229465	
13,700.00	91.00	329.57	11,144.78	2,837.33	503.31	14,430,091.96	1,693,136.35	39.73444616	-80.81247413	
13,800.00	91.00	329.57	11,143.04	2,923.54	452.67	14,430,178.17	1,693,085.71	39.73468321	-80.81265361	
13,900.00	91.00	329.57	11,141.30	3,009.75	402.03	14,430,264.39	1,693,035.07	39.73492027	-80.81283310	
14,000.00	91.00	329.57	11,139.55	3,095.96	351.39	14,430,350.60	1,692,984.43	39.73515733	-80.81301259	
14,100.00	91.00	329.57	11,137.81	3,182.18	300.75	14,430,436.81	1,692,933.79	39.73539438	-80.81319208	
14,200.00	91.00	329.57	11,136.07	3,268.39	250.11	14,430,523.02	1,692,883.15	39.73563144	-80.81337156	
14,300.00	91.00	329.57	11,134.33	3,354.60	199.47	14,430,609.24	1,692,832.51	39.73586849	-80.81355106	
14,400.00	91.00	329.57	11,132.59	3,440.81	148.83	14,430,695.45	1,692,781.87	39.73610555	-80.81373055	
14,500.00	91.00	329.57	11,130.85	3,527.03	98.19	14,430,781.66	1,692,731.23	39.73634260	-80.81391004	
14,600.00	91.00	329.57	11,129.10	3,613.24	47.55	14,430,867.87	1,692,680.59	39.73657965	-80.81408954	
14,700.00	91.00	329.57	11,127.36	3,699.45	-3.09	14,430,954.09	1,692,629.95	39.73681671	-80.81426903	
14,800.00	91.00	329.57	11,125.62	3,785.66	-53.73	14,431,040.30	1,692,579.31	39.73705376	-80.81444853	
14,900.00	91.00	329.57	11,123.88	3,871.88	-104.37	14,431,126.51	1,692,528.67	39.73729081	-80.81462803	
15,000.00	91.00	329.57	11,122.14	3,958.09	-155.01	14,431,212.72	1,692,478.04	39.73752787	-80.81480753	
15,100.00	91.00	329.57	11,120.40	4,044.30	-205.65	14,431,298.94	1,692,427.40	39.73776492	-80.81498703	
15,200.00	91.00	329.57	11,118.66	4,130.51	-256.29	14,431,385.15	1,692,376.76	39.73800197	-80.81516653	
15,300.00	91.00	329.57	11,116.91	4,216.73	-306.93	14,431,471.36	1,692,326.12	39.73823902	-80.81534603	
15,400.00	91.00	329.57	11,115.17	4,302.94	-357.57	14,431,557.57	1,692,275.48	39.73847607	-80.81552554	
15,500.00	91.00	329.57	11,113.43	4,389.15	-408.20	14,431,643.78	1,692,224.84	39.73871313	-80.81570504	
15,600.00	91.00	329.57	11,111.69	4,475.36	-458.84	14,431,730.00	1,692,174.20	39.73895018	-80.81588455	
15,700.00	91.00	329.57	11,109.95	4,561.58	-509.48	14,431,816.21	1,692,123.56	39.73918723	-80.81606406	
15,800.00	91.00	329.57	11,108.21	4,647.79	-560.12	14,431,902.42	1,692,072.92	39.73942428	-80.81624357	
15,900.00	91.00	329.57	11,106.47	4,734.00	-610.76	14,431,988.63	1,692,022.28	39.73966133	-80.81642308	
16,000.00	91.00	329.57	11,104.72	4,820.21	-661.40	14,432,074.85	1,691,971.64	39.73989838	-80.81660259	
16,100.00	91.00	329.57	11,102.98	4,906.43	-712.04	14,432,161.06	1,691,921.00	39.74013543	-80.81678210	
16,200.00	91.00	329.57	11,101.24	4,992.64	-762.68	14,432,247.27	1,691,870.36	39.74037248	-80.81696161	
16,300.00	91.00	329.57	11,099.50	5,078.85	-813.32	14,432,333.48	1,691,819.72	39.74060953	-80.81714113	
16,400.00	91.00	329.57	11,097.76	5,165.06	-863.96	14,432,419.70	1,691,769.08	39.74084658	-80.81732065	
16,500.00	91.00	329.57	11,096.02	5,251.28	-914.60	14,432,505.91	1,691,718.44	39.74108362	-80.81750016	
16,600.00	91.00	329.57	11,094.27	5,337.49	-965.24	14,432,592.12	1,691,667.80	39.74132067	-80.81767968	
16,700.00	91.00	329.57	11,092.53	5,423.70	-1,015.88	14,432,678.33	1,691,617.16	39.74155772	-80.81785920	
16,800.00	91.00	329.57	11,090.79	5,509.91	-1,066.52	14,432,764.55	1,691,566.52	39.74179477	-80.81803873	
16,900.00	91.00	329.57	11,089.05	5,596.13	-1,117.16	14,432,850.76	1,691,515.88	39.74203182	-80.81821825	
17,000.00	91.00	329.57	11,087.31	5,682.34	-1,167.80	14,432,936.97	1,691,465.25	39.74226886	-80.81839777	
17,100.00	91.00	329.57	11,085.57	5,768.55	-1,218.44	14,433,023.18	1,691,414.61	39.74250591	-80.81857730	
17,200.00	91.00	329.57	11,083.83	5,854.77	-1,269.08	14,433,109.39	1,691,363.97	39.74274296	-80.81875682	
17,300.00	91.00	329.57	11,082.08	5,940.98	-1,319.72	14,433,195.61	1,691,313.33	39.74298000	-80.81893635	
17,400.00	91.00	329.57	11,080.34	6,027.19	-1,370.36	14,433,281.82	1,691,262.69	39.74321705	-80.81911588	
17,500.00	91.00	329.57	11,078.60	6,113.40	-1,421.00	14,433,368.03	1,691,212.05	39.74345409	-80.81929541	
17,600.00	91.00	329.57	11,076.86	6,199.62	-1,471.64	14,433,454.24	1,691,161.41	39.74369114	-80.81947494	
17,700.00	91.00	329.57	11,075.12	6,285.83	-1,522.28	14,433,540.46	1,691,110.77	39.74392818	-80.81965447	
17,800.00	91.00	329.57	11,073.38	6,372.04	-1,572.92	14,433,626.67	1,691,060.13	39.74416523	-80.81983401	



4705101647

Database: DB_Jul2216dt_v14
 Company: Tug Hill Operating LLC
 Project: Wetzel County, West Virginia (UTM17 NAD83)
 Site: Hansen
 Well: Hansen 1N-3HU (E)
 Wellbore: Sidetrack 01
 Design: rev3

Local Co-ordinate Reference: Well Hansen 1N-3HU (E)
 TVD Reference: GL=1247 @ 1247.00ft
 MD Reference: GL=1247 @ 1247.00ft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature

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Planned Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
17,900.00	91.00	329.57	11,071.63	6,458.25	-1,623.56	14,433,712.88	1,691,009.49	39.74440227	-80.82001354	
18,000.00	91.00	329.57	11,069.89	6,544.47	-1,674.19	14,433,799.09	1,690,958.85	39.74463932	-80.82019308	
18,100.00	91.00	329.57	11,068.15	6,630.68	-1,724.83	14,433,885.31	1,690,908.21	39.74487636	-80.82037262	
18,200.00	91.00	329.57	11,066.41	6,716.89	-1,775.47	14,433,971.52	1,690,857.57	39.74511341	-80.82055216	
18,300.00	91.00	329.57	11,064.67	6,803.10	-1,826.11	14,434,057.73	1,690,806.93	39.74535045	-80.82073170	
18,400.00	91.00	329.57	11,062.93	6,889.32	-1,876.75	14,434,143.94	1,690,756.29	39.74558749	-80.82091124	
18,500.00	91.00	329.57	11,061.19	6,975.53	-1,927.39	14,434,230.15	1,690,705.65	39.74582453	-80.82109078	
18,600.00	91.00	329.57	11,059.44	7,061.74	-1,978.03	14,434,316.37	1,690,655.01	39.74606158	-80.82127032	
18,700.00	91.00	329.57	11,057.70	7,147.95	-2,028.67	14,434,402.58	1,690,604.37	39.74629862	-80.82144987	
18,800.00	91.00	329.57	11,055.96	7,234.17	-2,079.31	14,434,488.79	1,690,553.73	39.74653566	-80.82162941	
18,900.00	91.00	329.57	11,054.22	7,320.38	-2,129.95	14,434,575.00	1,690,503.09	39.74677270	-80.82180896	
19,000.00	91.00	329.57	11,052.48	7,406.59	-2,180.59	14,434,661.22	1,690,452.46	39.74700974	-80.82198851	
19,100.00	91.00	329.57	11,050.74	7,492.80	-2,231.23	14,434,747.43	1,690,401.82	39.74724679	-80.82216806	
19,200.00	91.00	329.57	11,049.00	7,579.02	-2,281.87	14,434,833.64	1,690,351.18	39.74748383	-80.82234761	
19,300.00	91.00	329.57	11,047.25	7,665.23	-2,332.51	14,434,919.85	1,690,300.54	39.74772087	-80.82252716	
19,400.00	91.00	329.57	11,045.51	7,751.44	-2,383.15	14,435,006.07	1,690,249.90	39.74795791	-80.82270672	
19,500.00	91.00	329.57	11,043.77	7,837.65	-2,433.79	14,435,092.28	1,690,199.26	39.74819495	-80.82288627	
19,600.00	91.00	329.57	11,042.03	7,923.87	-2,484.43	14,435,178.49	1,690,148.62	39.74843199	-80.82306583	
19,700.00	91.00	329.57	11,040.29	8,010.08	-2,535.07	14,435,264.70	1,690,097.98	39.74866903	-80.82324538	
19,800.00	91.00	329.57	11,038.55	8,096.29	-2,585.71	14,435,350.92	1,690,047.34	39.74890607	-80.82342494	
19,900.00	91.00	329.57	11,036.80	8,182.50	-2,636.35	14,435,437.13	1,689,996.70	39.74914310	-80.82360450	
20,000.00	91.00	329.57	11,035.06	8,268.72	-2,686.99	14,435,523.34	1,689,946.06	39.74938014	-80.82378406	
20,100.00	91.00	329.57	11,033.32	8,354.93	-2,737.63	14,435,609.55	1,689,895.42	39.74961718	-80.82396362	
20,200.00	91.00	329.57	11,031.58	8,441.14	-2,788.27	14,435,695.76	1,689,844.78	39.74985422	-80.82414319	
20,300.00	91.00	329.57	11,029.84	8,527.35	-2,838.91	14,435,781.98	1,689,794.14	39.75009126	-80.82432275	
20,400.00	91.00	329.57	11,028.10	8,613.57	-2,889.54	14,435,868.19	1,689,743.50	39.75032829	-80.82450232	
20,500.00	91.00	329.57	11,026.36	8,699.78	-2,940.18	14,435,954.40	1,689,692.86	39.75056533	-80.82468188	
20,600.00	91.00	329.57	11,024.61	8,785.99	-2,990.82	14,436,040.61	1,689,642.22	39.75080237	-80.82486145	
20,700.00	91.00	329.57	11,022.87	8,872.20	-3,041.46	14,436,126.83	1,689,591.58	39.75103941	-80.82504102	
20,800.00	91.00	329.57	11,021.13	8,958.42	-3,092.10	14,436,213.04	1,689,540.94	39.75127644	-80.82522059	
20,900.00	91.00	329.57	11,019.39	9,044.63	-3,142.74	14,436,299.25	1,689,490.30	39.75151348	-80.82540017	
21,000.00	91.00	329.57	11,017.65	9,130.84	-3,193.38	14,436,385.46	1,689,439.67	39.75175051	-80.82557974	
21,100.00	91.00	329.57	11,015.91	9,217.05	-3,244.02	14,436,471.68	1,689,389.03	39.75198755	-80.82575931	
21,200.00	91.00	329.57	11,014.17	9,303.27	-3,294.66	14,436,557.89	1,689,338.39	39.75222458	-80.82593889	
21,300.00	91.00	329.57	11,012.42	9,389.48	-3,345.30	14,436,644.10	1,689,287.75	39.75246162	-80.82611846	
21,400.00	91.00	329.57	11,010.68	9,475.69	-3,395.94	14,436,730.31	1,689,237.11	39.75269865	-80.82629804	
21,500.00	91.00	329.57	11,008.94	9,561.90	-3,446.58	14,436,816.53	1,689,186.47	39.75293569	-80.82647762	
21,600.00	91.00	329.57	11,007.20	9,648.12	-3,497.22	14,436,902.74	1,689,135.83	39.75317272	-80.82665720	
21,700.00	91.00	329.57	11,005.46	9,734.33	-3,547.86	14,436,988.95	1,689,085.19	39.75340976	-80.82683678	
21,800.00	91.00	329.57	11,003.72	9,820.54	-3,598.50	14,437,075.16	1,689,034.55	39.75364679	-80.82701637	
21,900.00	91.00	329.57	11,001.97	9,906.75	-3,649.14	14,437,161.37	1,688,983.91	39.75388382	-80.82719595	
22,000.00	91.00	329.57	11,000.23	9,992.97	-3,699.78	14,437,247.59	1,688,933.27	39.75412085	-80.82737554	
22,100.00	91.00	329.57	10,998.49	10,079.18	-3,750.42	14,437,333.80	1,688,882.63	39.75435789	-80.82755512	
22,200.00	91.00	329.57	10,996.75	10,165.39	-3,801.06	14,437,420.01	1,688,831.99	39.75459492	-80.82773471	
22,300.00	91.00	329.57	10,995.01	10,251.60	-3,851.70	14,437,506.22	1,688,781.35	39.75483195	-80.82791430	
22,400.00	91.00	329.57	10,993.27	10,337.82	-3,902.34	14,437,592.44	1,688,730.71	39.75506898	-80.82809389	
22,500.00	91.00	329.57	10,991.53	10,424.03	-3,952.98	14,437,678.65	1,688,680.07	39.75530601	-80.82827348	
22,600.00	91.00	329.57	10,989.78	10,510.24	-4,003.62	14,437,764.86	1,688,629.43	39.75554305	-80.82845308	
22,700.00	91.00	329.57	10,988.04	10,596.45	-4,054.26	14,437,851.07	1,688,578.79	39.75578008	-80.82863267	
22,800.00	91.00	329.57	10,986.30	10,682.67	-4,104.90	14,437,937.29	1,688,528.15	39.75601711	-80.82881226	
22,900.00	91.00	329.57	10,984.56	10,768.88	-4,155.53	14,438,023.50	1,688,477.52	39.75625414	-80.82899186	
23,000.00	91.00	329.57	10,982.82	10,855.09	-4,206.17	14,438,109.71	1,688,426.88	39.75649117	-80.82917146	
23,100.00	91.00	329.57	10,981.08	10,941.30	-4,256.81	14,438,195.92	1,688,376.24	39.75672820	-80.82935106	
23,200.00	91.00	329.57	10,979.34	11,027.52	-4,307.45	14,438,282.14	1,688,325.60	39.75696523	-80.82953066	



4705101647 DD

Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Hansen 1N-3HU (E)
Company:	Tug Hill Operating LLC	TVD Reference:	GL=1247 @ 1247.00ft
Project:	Wetzel County, West Virginia (UTM17 NAD83)	MD Reference:	GL=1247 @ 1247.00ft
Site:	Hansen	North Reference:	Grid
Well:	Hansen 1N-3HU (E)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Sidetrack 01		
Design:	rev3		

Planned Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
23,300.00	91.00	329.57	10,977.59	11,113.73	-4,358.09	14,438,368.35	1,688,274.96	39.75720226	-80.82971026	
23,400.00	91.00	329.57	10,975.85	11,199.94	-4,408.73	14,438,454.56	1,688,224.32	39.75743928	-80.82988986	
23,500.00	91.00	329.57	10,974.11	11,286.15	-4,459.37	14,438,540.77	1,688,173.68	39.75767631	-80.83006947	
23,600.00	91.00	329.57	10,972.37	11,372.37	-4,510.01	14,438,626.98	1,688,123.04	39.75791334	-80.83024907	
23,700.00	91.00	329.57	10,970.63	11,458.58	-4,560.65	14,438,713.20	1,688,072.40	39.75815037	-80.83042868	
23,800.00	91.00	329.57	10,968.89	11,544.79	-4,611.29	14,438,799.41	1,688,021.76	39.75838740	-80.83060828	
23,900.00	91.00	329.57	10,967.14	11,631.00	-4,661.93	14,438,885.62	1,687,971.12	39.75862443	-80.83078789	
24,000.00	91.00	329.57	10,965.40	11,717.22	-4,712.57	14,438,971.83	1,687,920.48	39.75886145	-80.83096750	
24,100.00	91.00	329.57	10,963.66	11,803.43	-4,763.21	14,439,058.05	1,687,869.84	39.75909848	-80.83114711	
24,200.00	91.00	329.57	10,961.92	11,889.64	-4,813.85	14,439,144.26	1,687,819.20	39.75933551	-80.83132673	
24,300.00	91.00	329.57	10,960.18	11,975.85	-4,864.49	14,439,230.47	1,687,768.56	39.75957253	-80.83150634	
24,400.00	91.00	329.57	10,958.44	12,062.07	-4,915.13	14,439,316.68	1,687,717.92	39.75980956	-80.83168596	
24,425.08	91.00	329.57	10,958.00	12,083.69	-4,927.83	14,439,338.30	1,687,705.22	39.75986900	-80.83173100	

PBHL/TD 24425.08 MD/10958.00 TVD

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
Hansen 1N-3HU BHL r3 - hit/miss target - Shape - Point	0.00	0.00	10,958.00	12,083.69	-4,927.83	14,439,338.30	1,687,705.22	39.75986900	-80.83173100	
Hansen 1N-3HU LP - plan misses target center by 86.23ft at 11784.28ft MD (11178.14 TVD, 1185.74 N, 1473.42 E) - Point	0.00	0.00	11,179.02	1,142.08	1,399.06	14,428,396.72	1,694,032.10	39.72978530	-80.80930075	
Hansen 1N-3HU LP 100 - plan hits target center - Point	0.00	0.00	11,179.02	1,142.08	1,499.07	14,428,396.72	1,694,132.10	39.72978472	-80.80894506	

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")	
10,262.80	10,075.02		9-5/8	12-1/4	

Plan Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment	
		+N/-S (ft)	+E/-W (ft)		
2,835.01	2,834.77	-2.97	6.47	S/T Begin 2°/100' drop/turn	
2,935.01	2,934.40	-5.70	14.59	Begin 2°/100' build/turn	
3,411.52	3,405.00	9.86	84.14	Begin 13.21° tangent section	
10,798.89	10,596.93	570.97	1,676.16	Begin 10°/100' build/turn	
11,733.64	11,179.02	1,142.08	1,499.06	Begin 91.00° lateral	
24,425.08	10,958.00	12,083.69	-4,927.83	PBHL/TD 24425.08 MD/10958.00 TVD	

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Area of Review

Sources of information to Support 35CSR8 - 5.11: 9.3 et seq.

Description of process to identify potential pathways for well communication during hydraulic fracturing activities.

Data Sources Reviewed:

1. IHS Well Data service: Public nationwide data service that pulls directly from State agency Oil and Gas databases
2. Farm Maps
3. Topo Maps: Recent and older (contact WVGES)
4. Check with DPS

Contacted Devin Ducoeur 724-705-0444, dducoeur@dpslandservices.com DPS GIS (1/14/2019) to have him make maps of the wellbores with his information. DPS utilizes WVGES maps for their mapping seems it as the best publicly available. See attached map he provided.

Request maps for:

1. Wellbore with IHS All Wells Layer
2. Map with Farm lines overlain and any well spots identified on Farm Maps
3. More recent (1970s vintage) topos and older topos

Discussion with Phil Dinterman WVGES GIS Department (7/15/2016)

- WVGES has plotted every well spot they have access to and are aware of with that contains a coordinate. 30000, 70000, and 90000 series wells are available via the WVGES online map. Some locations aren't great due to vintage and manipulation of maps through time
- 30000 series – any well drilled prior to 1929 – APIs were not assigned to original wells
- 70000 series – Well spots pulled from old Farm line maps that the WVGES has access to
- 90000 series – Any sources that the WVGES has access that shows a well spot but has no additional supporting information. DEP does not have 90000 series on their maps.
- There can be duplication between wells in the 3 series
- Phil indicated that other Operators are providing a screenshot of the WVGES map with their planned well and using that for permits

Permit well - Hansen 3HU

Wells within 500' Buffer

Note: Well spots depicted on Area of Review map (page 3) are derived from State held coordinates. The spots may differ from those depicted on the Well Plat because the Plat locations represent actual field surveyed locations. Please refer to the Plat for surveyed well spots

API Number	Operator Name	Total Depth	Perforated Fms	Producing zones not perforated	Is this well "known or reasonably expected to penetrate a depth that could be within the range of Fracture propagation"? 1000' is max limit I would assign to wells that might be within in range of fracture propagation	Comments
4705101645 4705101646	Tug Hill Operating Gastar Exploration	6522' TVD, 12308 MD	Marcellus Shale	None	No, the well is not deep enough to be within the expected fracture propagation from a Point Pleasant stimulation.	Marcellus Horizontal Well, Producing Cancelled Location
4705101647 4705101648	Tug Hill Operating (Gastar Exploration) Gastar Exploration	6,067' TVD, 6,409 TMD, Top holed only	None	None	No, the well is not deep enough to be within the expected fracture propagation from a Point Pleasant stimulation.	Top hole only, Revised to be current Hansen No. 3H utilizing Utica well the existing top hole Cancelled Location
4705101649 4705101650 4705101651	Tug Hill Operating Gastar Exploration Gastar Exploration	6532' TVD, 12178 MD	Marcellus Shale	None	No, the well is not deep enough to be within the expected fracture propagation from a Point Pleasant stimulation.	Marcellus Horizontal Well, Producing Cancelled Location Cancelled Location
4705101652 4705101653	Tug Hill Operating Gastar Exploration	6532' TVD, 12178 MD	Marcellus Shale	None	No, the well is not deep enough to be within the expected fracture propagation from a Point Pleasant stimulation.	Marcellus Horizontal Well, Producing Cancelled Location
4705101654	Tug Hill Operating (Gastar Exploration)	5760' TVD, top holed only	None	None	No, the well is not deep enough to be within the expected fracture propagation from a Point Pleasant stimulation.	Top hole only

4705101647 PD

Well: County = 51 Permit = 01648

Location Information: [View Map](#)

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_16	LAY_CD	LON_CD	UTME	UTRN
4705101648	Marshall	1549	Franklin	New-Marcusville	New-Marcusville	29-702700	50-812478	418218.4	4387464.1

Bottom Hole Location Information:

API	EP	FLD	UTME	UTRN	LON_CD	LAY_CD
4705101648	AS	00000	418218.4	4387464.1	50-812478	29-702700

Owner Information:

API	CMP_ID	SUFFIX	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_AT_COMPLETION	PROP_VD	PROP_TROT_FM	TITLE_EST_FM
4705101648	000		00000	00000	48	00000	00000	00000	Bayar, Mineral Sciences LLC et al	Gasar Exploration USA, Inc	2469	Marcellus Fm	0000

Completion Information:

API	CMP_ID	SUFFIX	ELEV DATUM	FIELD	DEEPEST_FM	DEEPEST_FMT	INITIAL_CLASS	FINAL_CLASS	TYPE	RIG	CMP_MTHD	TVD	TMD	NEW_FTO	RCD	G_BEF	G_AFT	O_BEF	O_AFT	NGL_BEF	NGL_AFT	P_BEF	T_BEF
4705101648	000		000	00000	1248	00000																	

Comment: -- Additional Lease Numbers: WV16-0076-001/WV16-0095-006

There is no Pay data for this well

There is no Production Gas data for this well

There is no Production Oil data for this well ** some operators may have reported NGL under Oil

There is no Production NGL data for this well ** some operators may have reported NGL under Oil

There is no Production Water data for this well

There is no Stratigraphy data for this well

There is no Wireline (E-Log) data for this well

There is no Plugging data for this well

There is no Sample data for this well

Well: County = 51 Permit = 01648

Location Information: [View Map](#)

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_16	LAY_CD	LON_CD	UTME	UTRN
4705101649	Marshall	1549	Franklin	New-Marcusville	New-Marcusville	29-702700	50-812478	418218.4	4387464.1

Bottom Hole Location Information:

API	EP	FLD	UTME	UTRN	LON_CD	LAY_CD
4705101649	AS	00000	418218.4	4387464.1	50-812478	29-702700

Owner Information:

API	CMP_ID	SUFFIX	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_AT_COMPLETION	PROP_VD	PROP_TROT_FM	TITLE_EST_FM
4705101649	000		00000	00000	48	00000	00000	00000	Bayar, Mineral Sciences LLC et al	Gasar Exploration USA, Inc	2469	Marcellus Fm	0000

Completion Information:

API	CMP_ID	SUFFIX	ELEV DATUM	FIELD	DEEPEST_FM	DEEPEST_FMT	INITIAL_CLASS	FINAL_CLASS	TYPE	RIG	CMP_MTHD	TVD	TMD	NEW_FTO	RCD	G_BEF	G_AFT	O_BEF	O_AFT	NGL_BEF	NGL_AFT	P_BEF	T_BEF
4705101649	000		000	00000	1248	00000																	

Comment: -- Additional Lease Numbers: WV16-0075-001/WV16-0127-001; KOP 8420

Pay/Show/Water Information:

API	CMP_ID	ACTIVITY	PRODUCT	SECTION	DEPTH_TOP	FM_TOP	DEPTH_BOY	FM_BOY	Q_BEF	G_AFT	O_BEF	O_AFT	WATER_QNTY
4705101649	418218.4	1549	Franklin	Vertical	1590	00	1590	00					

Production Gas Information: (Volumes in Mcf) * 2018 data are incomplete at this time

API	PRODUCING_OPERATOR	PRD_YEAR	ANN	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
4705101649	Gasar Exploration USA, Inc	2014	12,858	0	0	0	0	0	0	0	0	0	0	0	0

Production Oil Information: (Volumes in Bbl) ** some operators may have reported NGL under Oil * 2018 data are incomplete at this time

API	PRODUCING_OPERATOR	PRD_YEAR	ANN	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
4705101649	Gasar Exploration USA, Inc	2014	2,040	0	0	0	0	0	0	0	0	0	0	0	0

Production NGL Information: (Volumes in Bbl) ** some operators may have reported NGL under Oil * 2018 data are incomplete at this time

API	PRODUCING_OPERATOR	PRD_YEAR	ANN	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
4705101649	Gasar Exploration USA, Inc	2014	0	0	0	0	0	0	0	0	0	0	0	0	0

Production Water Information: (Volumes in Gallons) * 2018 data are incomplete at this time

API	PRODUCING_OPERATOR	PRD_YEAR	ANN	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
4705101649	Gasar Exploration USA, Inc	2014	2,040	0	0	0	0	0	0	0	0	0	0	0	0

Well: County = 51 Permit = 01650

Location Information: [View Map](#)

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_16	LAY_CD	LON_CD	UTME	UTRN
4705101650	Marshall	1549	Franklin	New-Marcusville	New-Marcusville	29-702600	50-812468	418218.4	4387464.1

Bottom Hole Location Information:

API	EP	FLD	UTME	UTRN	LON_CD	LAY_CD
4705101650	AS	00000	418218.4	4387464.1	50-812468	29-702600

Owner Information:

API	CMP_ID	SUFFIX	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_AT_COMPLETION	PROP_VD	PROP_TROT_FM	TITLE_EST_FM
4705101650	000		00000	00000	48	00000	00000	00000	Bayar, Mineral Sciences LLC et al	Gasar Exploration USA, Inc	2469	Marcellus Fm	0000

Completion Information:

API	CMP_ID	SUFFIX	ELEV DATUM	FIELD	DEEPEST_FM	DEEPEST_FMT	INITIAL_CLASS	FINAL_CLASS	TYPE	RIG	CMP_MTHD	TVD	TMD	NEW_FTO	RCD	G_BEF	G_AFT	O_BEF	O_AFT	NGL_BEF	NGL_AFT	P_BEF	T_BEF
4705101650	000		000	00000	1248	00000																	

Comment: -- Additional Lease Numbers: WV16-0069-000/WV16-0127-001/WV16-0115-000

There is no Pay data for this well

There is no Production Gas data for this well

There is no Production Oil data for this well ** some operators may have reported NGL under Oil

There is no Production NGL data for this well ** some operators may have reported NGL under Oil

There is no Production Water data for this well

There is no Stratigraphy data for this well

There is no Wireline (E-Log) data for this well

There is no Plugging data for this well

There is no Sample data for this well

Office of Oil and Gas
 Received
 JAN 28 2019
 WV Dept. of Environmental Protection

Well: County = 51 Permit = 01651

Location Information: [View Map](#)

API	COUNTY	PERMIT	TAX DISTRICT	QUAD_75	QUAD_16	LAT_DD	LONG_DD	UTME	UTMN
470510241	Marshall	1861	Franklin	New Marcellus	New Marcellus	32.72822	-90.81547	5192147	4321408

Bottom Hole Location Information:

API	EP FLAG	UTME	UTMN	LONG_DD	LAT_DD
470510241	1	5192147	4321408	-90.81547	32.72822

Owner Information:

API	CMP_ID	SUFFIX	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR	AT_COMPLETION	PROP_VD	PROP_TRGT_FM	TYM_EST_PR
470510241	Bayar/Marcellus Sciences LLC	...	...	...	...	Bayar/Marcellus Sciences LLC et al	Gas/Et Propane	USA, Inc.	5455	Marcellus Fm	500

Completion Information:

API	CMP_ID	SPUD_DT	ELEV DATUM	FIELD	DEEPEST_FM	DEEPEST_FHT	INITIAL_CLASS	FINAL_CLASS	TYPE	RIG	CMP_MTHD	TVD	NEW_FTG	RIGG	O_BEF	O_AFT	O_BEF	O_AFT	NGL_BEF	NGL_AFT	F_BEF	F_AFT	
470510241

Comment: -/- Additional Lease Numbers: WV16-0127-001/WV16-0115-000

There is no Pay data for this well

There is no Production Gas data for this well

There is no Production Oil data for this well ** some operators may have reported NGL under Oil

There is no Production NGL data for this well ** some operators may have reported NGL under Oil

There is no Production Water data for this well

There is no Stratigraphy data for this well

There is no Wireline (E-Log) data for this well

There is no Plugging data for this well

There is no Sample data for this well

Well: County = 51 Permit = 01652

Location Information: [View Map](#)

API	COUNTY	PERMIT	TAX DISTRICT	QUAD_75	QUAD_16	LAT_DD	LONG_DD	UTME	UTMN
470510242	Marshall	1862	Franklin	New Marcellus	New Marcellus	32.72822	-90.81547	5192147	4321408

Bottom Hole Location Information:

API	EP FLAG	UTME	UTMN	LONG_DD	LAT_DD
470510242	1	5192147	4321408	-90.81547	32.72822

Owner Information:

API	CMP_ID	SUFFIX	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR	AT_COMPLETION	PROP_VD	PROP_TRGT_FM	TYM_EST_PR
470510242	Bayar/Marcellus Sciences LLC	...	...	...	...	Bayar/Marcellus Sciences LLC et al	Gas/Et Propane	USA, Inc.	5455	Marcellus Fm	500

Completion Information:

API	CMP_ID	SPUD_DT	ELEV DATUM	FIELD	DEEPEST_FM	DEEPEST_FHT	INITIAL_CLASS	FINAL_CLASS	TYPE	RIG	CMP_MTHD	TVD	NEW_FTG	RIGG	O_BEF	O_AFT	O_BEF	O_AFT	NGL_BEF	NGL_AFT	F_BEF	F_AFT	
470510242

Comment: -/- Additional Lease Numbers: WV16-0075-001/WV16-0127-001

Pay/Show/Water Information:

API	CMP_ID	ACTIVITY	PRODUCT	SECTION	DEPTH_TOP	FM_TOP	DEPTH_BOTTOM	FM_BOTTOM	O_BEF	O_AFT	O_BEF	O_AFT	WATER_GNTY
470510242

Production Gas Information (Volumes in Mscf) * 2018 data are incomplete at this time

API	PRODUCING_OPERATOR	PRD_YEAR	ANN	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
470510242	Gas/Et Propane USA, Inc.	2018	12,601	0	0	0	0	0	0	0	0	0	0	0	12,601

Production Oil Information (Volumes in Bbl) ** some operators may have reported NGL under Oil * 2018 data are incomplete at this time

API	PRODUCING_OPERATOR	PRD_YEAR	ANN	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
470510242	Gas/Et Propane USA, Inc.	2018	20,222	2,505	4,424	3,317	3,004	1,905	2,419	2,388	1,130	827	1,877	1,770	1,510

Production NGL Information (Volumes in Bbl) ** some operators may have reported NGL under Oil * 2018 data are incomplete at this time

API	PRODUCING_OPERATOR	PRD_YEAR	ANN	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
470510242	Gas/Et Propane USA, Inc.	2018	0	0	0	0	0	0	0	0	0	0	0	0	0

Production Water Information (Volumes in Gallons) * 2018 data are incomplete at this time

API	PRODUCING_OPERATOR	PRD_YEAR	ANN	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
470510242	Gas/Et Propane USA, Inc.	2018	2,232	21	35	84	233	230	258	259	255	221	220	192	159

Well: County = 51 Permit = 01653

Location Information: [View Map](#)

API	COUNTY	PERMIT	TAX DISTRICT	QUAD_75	QUAD_16	LAT_DD	LONG_DD	UTME	UTMN
470510243	Marshall	1863	Franklin	New Marcellus	New Marcellus	32.72708	-90.81674	5192144	4321473

Bottom Hole Location Information:

API	EP FLAG	UTME	UTMN	LONG_DD	LAT_DD
470510243	1	5192144	4321473	-90.81674	32.72708

Owner Information:

API	CMP_ID	SUFFIX	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR	AT_COMPLETION	PROP_VD	PROP_TRGT_FM	TYM_EST_PR
470510243	Bayar/Marcellus Sciences LLC	...	...	...	...	Bayar/Marcellus Sciences LLC et al	Gas/Et Propane	USA, Inc.	5455	Marcellus Fm	500

Completion Information:

API	CMP_ID	SPUD_DT	ELEV DATUM	FIELD	DEEPEST_FM	DEEPEST_FHT	INITIAL_CLASS	FINAL_CLASS	TYPE	RIG	CMP_MTHD	TVD	NEW_FTG	RIGG	O_BEF	O_AFT	O_BEF	O_AFT	NGL_BEF	NGL_AFT	F_BEF	F_AFT	
470510243

Comment: -/- Additional Lease Numbers: WV16-0127-001/WV16-0115-000

There is no Pay data for this well

There is no Production Gas data for this well

There is no Production Oil data for this well ** some operators may have reported NGL under Oil

There is no Production NGL data for this well ** some operators may have reported NGL under Oil

There is no Production Water data for this well

There is no Stratigraphy data for this well

There is no Wireline (E-Log) data for this well

There is no Plugging data for this well

There is no Sample data for this well

4705101647DD

WV Geological & Economic Survey Well: County = 51 Permit = 01654

Location Information: [View Map](#)

ARI	COUNTY	PERMIT	TAX DISTRICT	QUAD_76	QUAD_76	QUAD_76	LAT_DD	LONG_DD	UTME	UTMN
470510164	Marshall	1654	Franklin	New Marlsville	New Marlsville	New Marlsville	39.726879	-80.814348	415018.4	4907400.4

Bottom Hole Location Information:

ARI	SP	FLGS	UTME	UTMN	LONG_DD	LAT_DD
470510164	1	SA	415018.4	4907400.4	-80.814348	39.726879
470510164	1	SA	415018.4	4907400.4	-80.814348	39.726879

Owner Information:

ARI	COMP_ID	SUFFIX	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_AT_COMPLETION	PROP_VD	PROP_TYD	FM	TYRLEST	FM
470510164	1	1	1	Coalbrook Bank National Records LLC	74	74	74	74	74	74	74	74	74	74	74

Completion Information:

ARI	COMP_ID	SPUD_ID	ELEV	DATUM	FIELD	DEPTH_FW	DEPTH_FHT	INITIAL_CLASS	FINAL_CLASS	TYPE	RIG	COMP_MTHD	TYD	TYD_NEW_FTO	ROD	O_BEF	O_AFT	O_BEF	O_AFT	NSL	BSL	
470510164	1	1	422.214	1245	Struck	14.0	14.0	Production Well	Production Well	not available	4046	Horizontal	2700	2700	0	0	0	0	0	0	0	0

Comment: --- Additional Lesse Numbers WV15-0376-001 WV15-0127-001

Pay/Show/Water Information:

ARI	COMP_ID	ACTIVITY	PRODUCT	SECTION	DEPTH_TOP	FM_TOP	DEPTH_BOTTOM	FM_BOTTOM	O_BEF	O_AFT	O_BEF	O_AFT	WATER_ONLY
470510164	1	1	Water	Vertical	0	0	0	0	0	0	0	0	0
470510164	1	1	Water	Vertical	1500	1500	1500	1500	0	0	0	0	0

Production Gas Information: (Volumes in Mcf) - 2018 data are incomplete at this time

ARI	PRODUCING_OPERATOR	PROD_YEAR	ANL_GAS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
470510164	Tug Hill Operating LLC	2017	0	0	0	0	0	0	0	0	0	0	0	0	0
470510164	Tug Hill Operating LLC	2018	0	0	0	0	0	0	0	0	0	0	0	0	0

Production Oil Information: (Volumes in Bbl) - 2018 data are incomplete at this time

ARI	PRODUCING_OPERATOR	PROD_YEAR	ANL_OIL	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
470510164	Tug Hill Operating LLC	2017	0	0	0	0	0	0	0	0	0	0	0	0	0
470510164	Tug Hill Operating LLC	2018	0	0	0	0	0	0	0	0	0	0	0	0	0

Production NGL Information: (Volumes in Bbl) - 2018 data are incomplete at this time

ARI	PRODUCING_OPERATOR	PROD_YEAR	ANL_NGL	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
470510164	Tug Hill Operating LLC	2017	0	0	0	0	0	0	0	0	0	0	0	0	0
470510164	Tug Hill Operating LLC	2018	0	0	0	0	0	0	0	0	0	0	0	0	0

Production Water Information: (Volumes in Gallons) - 2018 data are incomplete at this time

ARI	PRODUCING_OPERATOR	PROD_YEAR	ANL_WTR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
470510164	Tug Hill Operating LLC	2017	0	0	0	0	0	0	0	0	0	0	0	0	0
470510164	Tug Hill Operating LLC	2018	0	0	0	0	0	0	0	0	0	0	0	0	0

Stratigraphy Information:

ARI	SUFFIX	FM	QUALITY	DEPTH_TOP	DEPTH_BOTTOM	THICKNESS	THICKNESS	QUALITY	ELEV DATUM
470510164	Dsd	Drgl	Coal	757	Reasonable	1245	Reasonable	1245	Ground Level
470510164	Dsd	Drgl	Coal	825	Reasonable	1245	Reasonable	1245	Ground Level
470510164	Dsd	Drgl	Coal	1007	Reasonable	1245	Reasonable	1245	Ground Level
470510164	Dsd	Drgl	Coal	2007	Reasonable	1245	Reasonable	1245	Ground Level
470510164	Dsd	Drgl	Coal	2028	Reasonable	1245	Reasonable	1245	Ground Level
470510164	Dsd	Drgl	Coal	2298	Reasonable	1245	Reasonable	1245	Ground Level
470510164	Dsd	Drgl	Coal	2448	Reasonable	1245	Reasonable	1245	Ground Level
470510164	Dsd	Drgl	Coal	2505	Reasonable	1245	Reasonable	1245	Ground Level
470510164	Dsd	Drgl	Coal	2540	Reasonable	1245	Reasonable	1245	Ground Level
470510164	Dsd	Drgl	Coal	2602	Reasonable	1245	Reasonable	1245	Ground Level
470510164	Dsd	Drgl	Coal	2602	Reasonable	1245	Reasonable	1245	Ground Level

There is no Wireline (E-Log) data for this well

There is no Flugging data for this well

There is no Sample data for this well

Received
 JAN 18 2019
 Office of Oil and Gas
 West Virginia Department of Environmental Protection

4705101647
DD

WW-9
(4/16)

API Number 47 - 051 - 01647
Operator's Well No. Hansen 3HU

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OFFICE OF OIL AND GAS

FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name Tug Hill Operating, LLC OP Code 494510851

Watershed (HUC 10) French Creek - Ohio River Quadrangle New Martinsville 7.5'

Do you anticipate using more than 5,000 bbls of water to complete the proposed well work? Yes No

Will a pit be used? Yes No

If so, please describe anticipated pit waste: AST Tanks with proper containment will be used for staging fresh water for frac and flow back water

Will a synthetic liner be used in the pit? Yes No If so, what ml.? AST Tanks will be used with proper contain⁺

Proposed Disposal Method For Treated Pit Wastes:

- Land Application
- Underground Injection (UIC Permit Number UIC 9658, UIC2D0732540, UIC2D0732523)
- Reuse (at API Number _____)
- Off Site Disposal (Supply form WW-9 for disposal location)
- Other (Explain _____)

Will closed loop system be used? If so, describe: Yes - For Vertical and Horizontal Drilling

Drilling medium anticipated for this well (vertical and horizontal)? Air, freshwater, oil based, etc. Air for vertical / Oil for Horizontal

-If oil based, what type? Synthetic, petroleum, etc. Synthetic Oil Base

Additives to be used in drilling medium? Barite for weight

Drill cuttings disposal method? Leave in pit, landfill, removed offsite, etc. Wetzel County Sanitary Landfill / Westmoreland Sanitary Landfill

-If left in pit and plan to solidify what medium will be used? (cement, lime, sawdust) N/A

-Landfill or offsite name/permit number? Wetzel County Sanitary Landfill (SWF-1021 / WV0109185) / Westmoreland Sanitary Landfill, LLC (SAN1405 / PA DEP EC#1386426)

Permittee shall provide written notice to the Office of Oil and Gas of any load of drill cuttings or associated waste rejected at any West Virginia solid waste facility. The notice shall be provided within 24 hours of rejection and the permittee shall also disclose where it was properly disposed.

I certify that I understand and agree to the terms and conditions of the GENERAL WATER POLLUTION PERMIT issued on August 1, 2005, by the Office of Oil and Gas of the West Virginia Department of Environmental Protection. I understand that the provisions of the permit are enforceable by law. Violations of any term or condition of the general permit and/or other applicable law or regulation can lead to enforcement action.

I certify under penalty of law that I have personally examined and am familiar with the information submitted on this application form and all attachments thereto and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment.

Company Official Signature Jim Pancake JAN 28 2019

Company Official (Typed Name) Jim Pancake

Company Official Title Vice President Geoscience

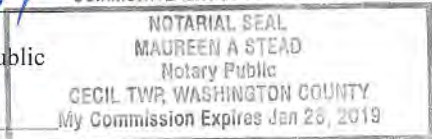
Subscribed and sworn before me this 21 day of JANUARY, 20 19

Maureen A Stead
1/28/19

Notary Public

My commission expires

COMMONWEALTH OF PENNSYLVANIA



4705 01647
DD

Form WW-9

Operator's Well No. Hansen 3HU

Tug Hill Operating, LLC

Proposed Revegetation Treatment: Acres Disturbed 28.28 Prevegetation pH 6.0

Lime 3 Tons/acre or to correct to pH 6.5

Fertilizer type 10-20-20

Fertilizer amount 500 lbs/acre

Mulch 2.5 Tons/acre

Seed Mixtures

Temporary		Permanent	
Seed Type	lbs/acre	Seed Type	lbs/acre
Winter Rye	168	Tall Fescue	40
Winter Wheat	180	Ladino Clover	3
Field Bromegrass	40	Redtop	3

Attach:

Maps(s) of road, location, pit and proposed area for land application (unless engineered plans including this info have been provided). If water from the pit will be land applied, include dimensions (L x W x D) of the pit, and dimensions (L x W), and area in acreage, of the land application area.

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: *Juan Melendez*

Comments: _____

Received
JAN 28 2019
Office of Oil and Gas
NY Dept. of Environmental Protection

Title: Oil and Gas Inspector

Date: 1/23/19

Field Reviewed? () Yes () No

WW-9

PROPOSED HANSEN 3HU #47-051-01647

SUPPLEMENT PG 1

SHEET 1

REFERENCE IS HEREBY MADE TO THE WV D.E.P. OFFICE OF OIL & GAS, "EROSION AND SEDIMENT CONTROL FIELD MANUAL" FOR REQUIREMENTS AND BMPs FOR AVERAGE FIELD CONDITIONS CONCERNING THE MAINTENANCE OF EXISTING ROADS AND THE CONSTRUCTION OF PROPOSED ROADS. FIELD CONDITIONS MAY REQUIRE VARIANCE FROM THESE GUIDELINES AND THE EARTHWORK CONTRACTOR IS RESPONSIBLE FOR NOTIFICATION TO THE INSPECTOR AND THE OPERATOR SHOULD THESE CONDITIONS OCCUR.

INSTALL CULVERTS AS SHOWN ON RECLAMATION PLAN OR AS FIELD CONDITIONS REQUIRE.

ENTRANCES ONTO PUBLIC ROADS SHALL BE CONSTRUCTED OR MAINTAINED IN ACCORDANCE WITH WV D.O.T. REGULATIONS. ADDITIONAL PERMITS MAY BE REQUIRED. TEMPORARILY SEED AND MULCH ALL SLOPES UPON CONSTRUCTION OF LOCATION.

ALL CUT AND FILL SLOPES ARE 2H : 1V SLOPE.

ALL TREES 6-INCHES AND ABOVE ARE TO BE CUT AND STACKED. BRUSH SLASHINGS ARE TO UTILIZED DOWN SLOPE OF SITE AND STRUCTURES TO ACT AS A CONTROL BARRIER IF AVAILABLE.

DRAWING NOT TO SCALE

COVESTRO, LLC
05-28-9
93.4 ACRES

COVESTRO, LLC
05-28-8
56.32 ACRES

CARL L. COFFIELD, SR.
& LANA R. COFFIELD
05-28-7
64 ACRES

COVESTRO, LLC
05-27-20
93.027 ACRES

COVESTRO, LLC
05-27-22
172.79 ACRES

663' @ 0% TO 16% GRADE

215' @ -3% TO -9% GRADE

494' @ 0% TO 4% GRADE

137' @ -2% TO -4% GRADE

572' @ 0% TO 2% GRADE

259' @ -4% TO -6% GRADE

SHEET 1
SHEET 2

TO WV STATE RTE. 2

TO CO. RTE. 78

COUNTY ROUTE 2/2

ACCESS ROAD

GRAVEL ROAD

EPHEMERAL STREAM

ACCESS ROAD

GRAVEL ROAD

ACCESS ROAD

CEMETERY

CLEARING LIMITS

APPROVED FOR CONSTRUCTION
JAN 16 2019
WV DEPARTMENT OF ENVIRONMENTAL POLICE

LEGEND

Note:
 (C) — Denotes existing culvert with appropriate sediment outlet control (Rip Rap splash pad).
 ***** Silt Fence and or Sediment and Erosion Control Measure.
 - - - - - Surface Boundary
 — + — Overhead Utility

WW-9

**PROPOSED HANSEN
3HU #47-051-01647**

SUPPLEMENT PG 1

SHEET 2

REFERENCE IS HEREBY MADE TO THE WV D.E.P. OFFICE OF OIL & GAS, "EROSION AND SEDIMENT CONTROL FIELD MANUAL" FOR REQUIREMENTS AND BMPs FOR AVERAGE FIELD CONDITIONS CONCERNING THE MAINTENANCE OF EXISTING ROADS AND THE CONSTRUCTION OF PROPOSED ROADS. FIELD CONDITIONS MAY REQUIRE VARIANCE FROM THESE GUIDELINES AND THE EARTHWORK CONTRACTOR IS RESPONSIBLE FOR NOTIFICATION TO THE INSPECTOR AND THE OPERATOR SHOULD THESE CONDITIONS OCCUR.

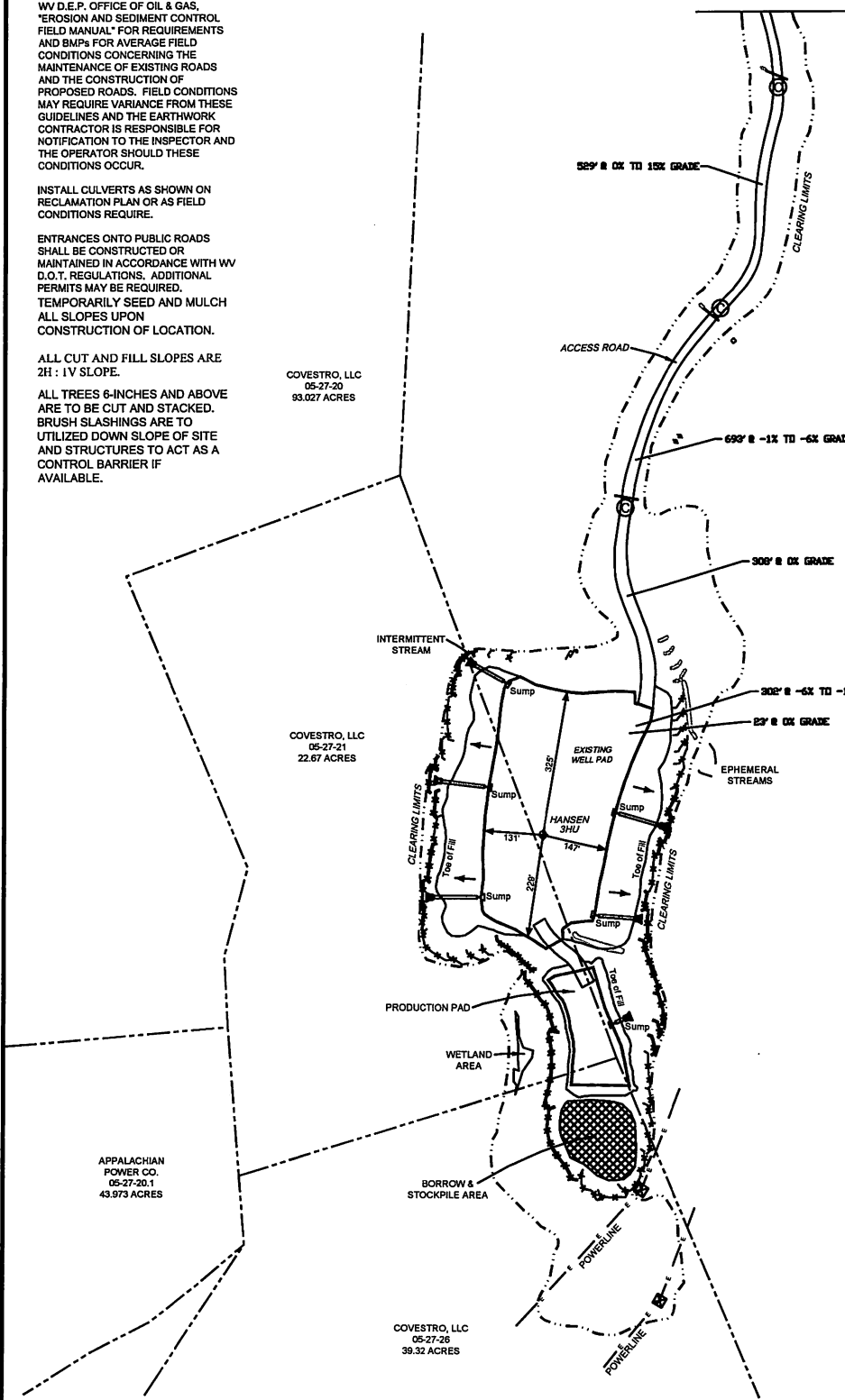
INSTALL CULVERTS AS SHOWN ON RECLAMATION PLAN OR AS FIELD CONDITIONS REQUIRE.

ENTRANCES ONTO PUBLIC ROADS SHALL BE CONSTRUCTED OR MAINTAINED IN ACCORDANCE WITH WV D.O.T. REGULATIONS. ADDITIONAL PERMITS MAY BE REQUIRED. TEMPORARILY SEED AND MULCH ALL SLOPES UPON CONSTRUCTION OF LOCATION.

ALL CUT AND FILL SLOPES ARE 2H : 1V SLOPE.

ALL TREES 6-INCHES AND ABOVE ARE TO BE CUT AND STACKED. BRUSH SLASHINGS ARE TO UTILIZED DOWN SLOPE OF SITE AND STRUCTURES TO ACT AS A CONTROL BARRIER IF AVAILABLE.

SHEET 1
SHEET 2



COVESTRO, LLC
05-27-22
172.79 ACRES

COVESTRO, LLC
05-27-20
93.027 ACRES

COVESTRO, LLC
05-27-21
22.67 ACRES

APPALACHIAN
POWER CO.
05-27-20.1
43.973 ACRES

COVESTRO, LLC
05-27-26
39.32 ACRES

LEGEND

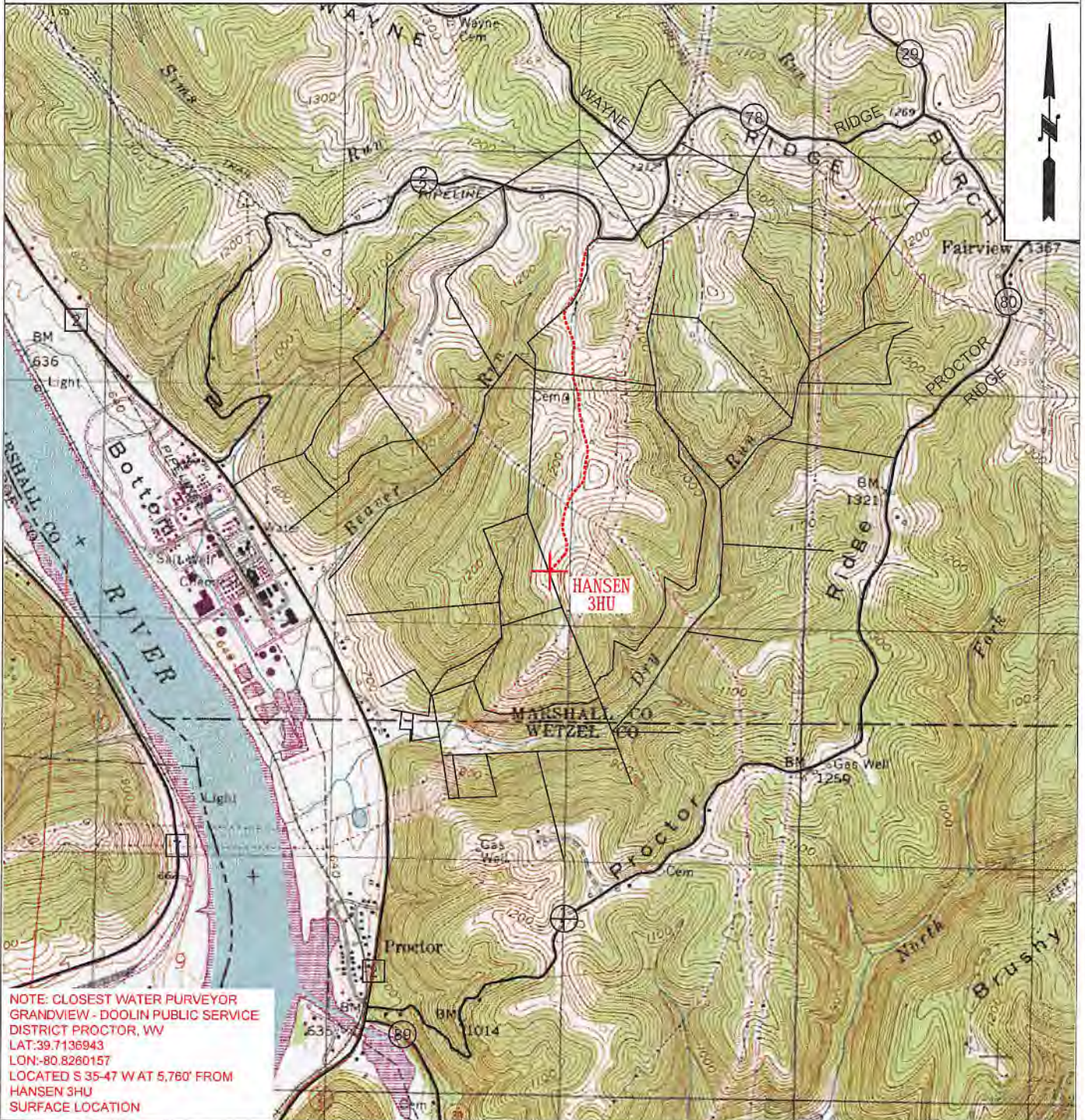
Note:
 © — Denotes existing culvert with appropriate sediment outlet control (Rip Rap splash pad).
 ***** Silt Fence and or Sediment and Erosion Control Measure.
 - - - - - Surface Boundary
 ——— Overhead Utility

Received
JAN 28 2019
WV Dept of Environmental Protection


WW-9

PROPOSED
HANSEN 3HU #47-051-01647

SUPPLEMENT PG 2



NOTE: CLOSEST WATER PURVEYOR
GRANDVIEW - DOOLIN PUBLIC SERVICE
DISTRICT PROCTOR, WV
LAT: 39.7136943
LON: -80.8280157
LOCATED S 35-47 W AT 5,760' FROM
HANSEN 3HU
SURFACE LOCATION

 TUG HILL OPERATING	OPERATOR 494510851 TUG HILL OPERATING, LLC 380 SOUTHPOINTE BLVD SUITE 200 CANONSBURG, PA 15317	TOPO SECTION NEW MARTINSVILLE 7.5'	LEASE NAME HANSEN
	SCALE: 1" = 2000'	DATE: 01/17/2019	

4705101647



Well Site Safety Plan
Tug Hill Operating, LLC

ju
7/8/19

Well Name: Hansen 3HU

Pad Location: Hansen

Marshall County, West Virginia

UTM (meters), NAD83, Zone 17:

NORTHING - 4,397,436.04

EASTING - 515,915.53

Updated June 2019

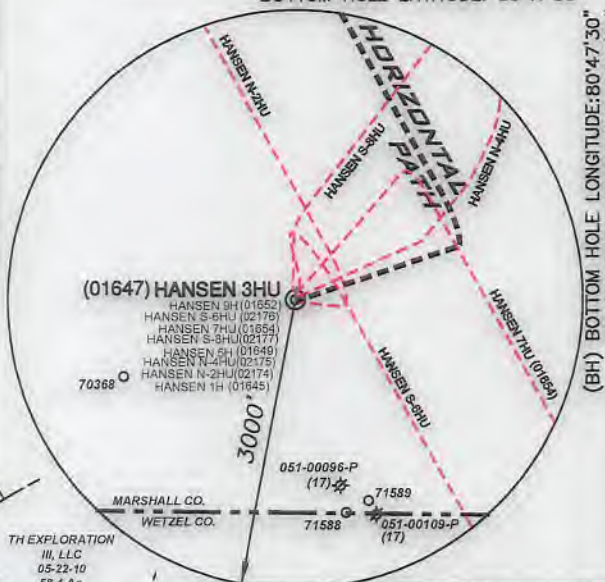
RECEIVED
Office of Oil and Gas
AUG - 9 2019
WV Department of
Environmental Protection

HANSEN LEASE WELL 3HU 426.3332± ACRES

NOTES

1. BORE PATH BASED ON GRID NORTH.
2. NO WATER WELLS WITHIN 250' OF WELL WERE FOUND, NO DWELLINGS WITHIN 825' OF PAD CENTER WERE FOUND.
3. OWNERSHIP TAKEN FROM PUBLIC RECORDS OF MARSHALL COUNTY, WV IN MARCH, 2017. COORDINATES AND WELL TIES BASED UPON DIFFERENTIAL GPS MEASUREMENTS.
4. WELL LOCATION REFERENCES ARE BASED UPON THE MAGNETIC MERIDIAN.
5. ALL DEEP WELLS WITHIN 3,000' OF LATERAL ARE SHOWN ON PLAT.

TOP HOLE LATITUDE: 39°45'00"
BOTTOM HOLE LATITUDE: 39°47'30"



LEGEND

- LEASE TRACTS
- SURFACE TRACTS
- WELL LATERAL
- POINT PLEASANT LEGS
- 400' BORE PATH OFFSET
- 500' WELL BORE OFFSET
- UNIT BOUNDARY
- (A) LEASE # (SEE 6A1 FORM)

SURFACE HOLE
UTM. NAD83, ZONE 17
IN METERS
N) 4,397,436.04
E) 515,915.53

LANDING POINT 1
UTM. NAD83, ZONE 17
IN METERS
N) 4,397,784.12
E) 516,372.50

BOTTOM HOLE
UTM. NAD83, ZONE 17
IN METERS
N) 4,401,119.12
E) 514,413.58

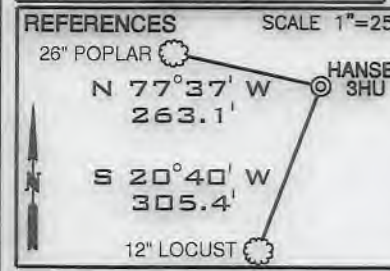
LINE	BEARING	DISTANCE
L1	N 58°19' W	1097.13'
L2	S 69°05' W	761.06'
L3	S 64°13' E	7.32
L4	N 71°33' E	1688.57'

NUMBER	CHORD DIRECTION	CHORD LENGTH	RADIUS	ARC LENGTH
C1	S 84°20' E	24.74'	34.50'	25.31'
C2	N 75°18' E	55.09'	347.52'	55.14'
C3	N 30°02' E	51.86'	46.91'	54.95'
C4	N 08°03' W	100.54'	322.48'	100.85'
C5	N 18°38' W	193.82'	1155.34'	194.05'
C6	N 25°14' W	273.80'	2289.23'	273.97'

(+) DENOTES LOCATION ON UNITED STATES TOPOGRAPHIC MAPS

DETAIL SKETCH "A"
SCALE 1"=200'

- HANSEN 9H (01652)
- HANSEN S-6HU (02176)
- HANSEN 7HU (01654)
- HANSEN S-8HU (02177)
- HANSEN 5H (01649)
- HANSEN N-4HU (02175)
- HANSEN 3HU (01647)
- HANSEN N-2HU (02174)
- HANSEN 1H (01645)



FILE NUMBER _____

DRAWING NUMBER HANSEN_3HU_REV3

SCALE 1" = 2000'

MINIMUM DEGREE OF ACCURACY 1/200

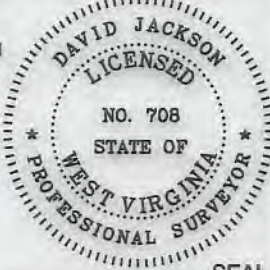
PROVEN SOURCE OF ELEVATION SUBMETER MAPPING
GRADE GPS

I, THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE RULES ISSUED AND PRESCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION

P.S. 708
David L Jackson



JACKSON SURVEYING INC.
P.O. Box 1460
Clarksburg, WV 26302
304-623-5851



WVDEP
OFFICE OF OIL & GAS
601 57TH STREET, SE
CHARLESTON, WV 25304

WELL TYPE: OIL ___ GAS X LIQUID INJECTION ___ WASTE DISPOSAL ___
(IF "GAS") PRODUCTION X STORAGE ___ DEEP X SHALLOW ___

DATE: JANUARY 26, 2019

REVISED: JULY 08, 2019

OPERATORS WELL NO. HANSEN 3HU

API WELL NO. 47-051-01647DD

STATE COUNTY PERMIT

LOCATION ELEVATION 1247.0' WATERSHED (HUC 10) FRENCH CREEK - OHIO RIVER

DISTRICT FRANKLIN COUNTY MARSHALL

QUADRANGLE NEW MARTINSVILLE 7.5' LEASE NUMBER _____ SEE WW-6A1 FORM

SURFACE OWNER COVESTRO, LLC ACREAGE 172.79

OIL & GAS ROYALTY OWNER PPG INDUSTRIES, INC. LEASE ACREAGE 172.79

PROPOSED WORK: DRILL ___ CONVERT ___ DRILL DEEPER X REDRILL ___ FRACTURE OR STIMULATE X PLUG OFF OLD FORMATION ___
PERFORATE NEW FORMATION ___ OTHER PHYSICAL CHANGE (SPECIFY) _____

TARGET FORMATION POINT PLEASANT ESTIMATED DEPTH TVD: 11,398' TMD: 24,425'

WELL OPERATOR TUG HILL OPERATING, LLC DESIGNATED AGENT DIANNA STAMPER
CT CORPORATION SYSTEM

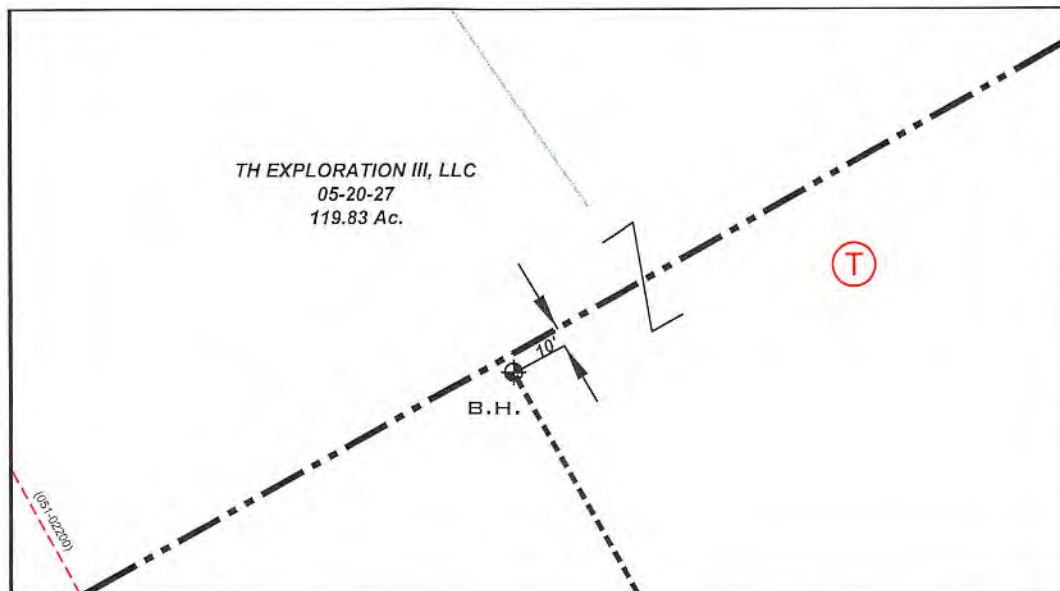
ADDRESS 1320 SOUTH UNIVERSITY DRIVE, SUITE 500
FORT WORTH, TX 76107 ADDRESS 5400 D BIG TYLER ROAD
CHARLESTON, WV 25313

COUNTY NAME
PERMIT

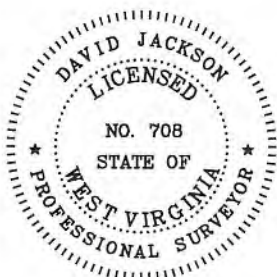
Form WW6

**HANSEN LEASE
WELL 3HU
426.3332± ACRES**

4705101647DD



Number	TAX MAP -PARCEL	ADJOINER OWNER	ACRES
S1	B 05-27-21	COVESTRO, LLC	22.67
S2	A 05-27-22	COVESTRO, LLC	172.79
S3	F 05-28-10	CAROL MARTIN	100.0
S4	E 05-28-9	COVESTRO, LLC	93.4
S5	05-28-2	COVESTRO, LLC	99.5
S6	G 05-28-3	TH EXPLORATION III, LLC	53.44
S7	H 05-22-13	JOHN M. MOORE , TERESA R. MOORE & ANDREA S. MOORE	40.57
S8	J 05-21-18	JOHN M. MOORE , TERESA R. MOORE & ANDREA S. MOORE	51.44
S9	K 05-21-20	JOHN M. MOORE , TERESA R. MOORE & ANDREA S. MOORE	31.0
S10	05-21-19.1	JOHN G. MOORE , ET AL	0.92
S11	Q 05-21-22	PEGGY LEE BOWEN, ET AL	18.29
S12	R 05-21-24	TH EXPLORATION III, LLC	132.5
S13	05-20-34	TH EXPLORATION III, LLC	116.7
S14	05-20-33	TH EXPLORATION III, LLC	42.186
S15	05-27-20.1	APPALACHIAN POWER CO.	43.973
S16	05-27-20	COVESTRO, LLC.	93.027
S17	05-27-19	COVESTRO, LLC.	33.786
S18	05-28-11	CAROL A. MARTIN	24.681
S19	05-21-15	TH EXPLORATION III, LLC	52.97
S20	05-21-16	TH EXPLORATION III, LLC	38.38
S21	05-21-17	TH EXPLORATION III, LLC	31.68
S22	05-21-8	TH EXPLORATION III, LLC	38.94
S23	05-21-3	TH EXPLORATION III, LLC	146.0
S24	05-20-32	TH EXPLORATION III, LLC	28.8
S25	05-20-29	TH EXPLORATION III, LLC	30.08
S26	05-19-23	WSD PROPERTIES, LLC	28.4
S27	05-22-1	MARY P. MASON, EST.	2.0
S28	05-22-2	TH EXPLORATION III, LLC	30.0
S29	O 05-22-18	EDWARD R. YOHO, JR.	77.13
S30	N 05-22-15	EDWARD R. YOHO, JR.	25.5
S31	05-22-16	EDWARD R. YOHO, JR.	57.0
S32	05-22-17	CNX GAS COMPANY, LLC.	37.5
S33	05-22-11	TH EXPLORATION III, LLC	55.65
S34	05-28-4	TH EXPLORATION III, LLC	48.44
S35	05-28-9	TH EXPLORATION III, LLC	63.44
S36	05-26-1	EDWIN BOOTH ANDERSON & MARK W. ANDERSON	12.94
S37	05-26-2	EDWIN BOOTH ANDERSON & MARK W. ANDERSON	67.5
S38	05-26-19	ERIC JAY & KARROLL S. BOOTH	50.0
S39	05-27-24	ROBERT F. ROTHLSBERGER	60.10
S40	C 05-27-23	ROBERT F. ROTHLSBERGER	35.77
S41	05-27-26	COVESTRO, LLC.	39.32
S42	05-27-27	JAMES ANDREW & KAREN R. LYNNE RICHMOND	8.9353
S43	D 05-28-8	COVESTRO, LLC.	56.32
S44	M 05-22-14	CONSOL RCPC, LLC.	0.30
S45	L 05-21-21	CONSOL RCPC, LLC.	4.0
S46	P 05-21-23	PEGGY LEE BROWN, ET AL	42.62
S47	S 05-20-28	TH EXPLORATION III, LLC	15.34
S48	I 05-22-12	TH EXPLORATION III, LLC	61.49



P.S. 708

David L Jackson



**TUG HILL
OPERATING**

OPERATOR'S
WELL #: HANSEN 3HU
DISTRICT: Franklin
COUNTY: Marshall
STATE: WV
API #: 47-051-01647

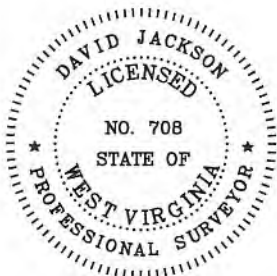
WELL PLAT
PAGE 2 OF 3
DATE: 01/26/2019
REVISED: 07/08/2019

form ww6

HANSEN LEASE
WELL 3HU
426.3332± ACRES

4705101647DD

Lease No.	Tags	Parcel	Oil & Gas Royalty Owner	Book	Page
10*14418	A	5-27-22	PPG INDUSTRIES, INC.	878	610
10*27022	B	5-27-21	COVESTRO LLC	1046	431
10*14609	C	5-27-23	PATRICIA M HADDIX	700	113
10*14610	C	5-27-23	SUZANNE HILL	699	45
10*14611	C	5-27-23	LILLIAN P GRIMM	699	41
10*14418	D	5-28-8	PPG INDUSTRIES, INC.	878	610
10*14418	E	5-28-9	PPG INDUSTRIES, INC.	878	610
10*14565	F	5-28-10	HARRY LEE GOUDY	670	59
10*14418	G	5-28-3	PPG INDUSTRIES, INC.	878	610
10*14482	G	5-28-3	RALPH EARNEST	745	578
10*14483	G	5-28-3	CHARLES H EARNEST	746	319
10*14484	G	5-28-3	ARTHUR L JOSEPH	748	474
10*14485	G	5-28-3	LINDA K HASSLEN	748	476
10*14486	G	5-28-3	THOMAS ATKINSON	754	248
10*14487	G	5-28-3	DOUGLAS ATKINSON	754	577
10*14488	G	5-28-3	HEATHER GUIDRY	754	244
10*14489	G	5-28-3	AUGUSTA L SPIHER	754	246
10*14490	G	5-28-3	JAMES WELCH JR	752	445
10*14491	G	5-28-3	CHRISTOPHER PRICE	752	208
10*14492	G	5-28-3	MARJORIE A MCLAUGHLIN	749	526
10*14937	H	5-22-13	JOHN M MOORE AND MELANIE A MOORE ETAL	850	524
10*14418	I	5-22-12	PPG INDUSTRIES, INC.	878	610
10*14937	J	5-21-18	JOHN M MOORE AND MELANIE A MOORE ETAL	850	524
10*14937	K	5-21-20	JOHN M MOORE AND MELANIE A MOORE ETAL	850	524
10*16471	L	5-21-21	CNX GAS COMPANY LLC	905	155
10*16471	M	5-22-14	CNX GAS COMPANY LLC	905	155
10*14457	N	5-22-15	HARRY LEE GOUDY	731	140
10*14457	O	5-22-18	HARRY LEE GOUDY	731	140
10*14947	P	5-21-23	DANA SMALLWOOD	850	520
10*14948	P	5-21-23	PEGGY L BROWN	850	522
10*14947	Q	5-21-22	DANA SMALLWOOD	850	520
10*14948	Q	5-21-22	PEGGY L BROWN	850	522
10*14418	R	5-21-24	PPG INDUSTRIES, INC.	878	610
10*14307	S	5-20-28	SALLY CYNTHIA HOPKINS	777	572
10*14308	S	5-20-28	MARY E BASSETT	779	492
10*14309	S	5-20-28	ROBERT B THOMAS	779	484
10*14310	S	5-20-28	JEAN C THOMAS	781	614
10*14324	S	5-20-28	RUTH E BASSETT MEADOWS	792	100
10*14325	S	5-20-28	ELIZABETH ANN STRAUSBAUGH	792	104
10*14326	S	5-20-28	JANET LEA BLANKENSHIP	792	580
10*14418	S	5-20-28	PPG INDUSTRIES, INC.	878	610
10*14307	T	5-20-27	SALLY CYNTHIA HOPKINS	777	572
10*14308	T	5-20-27	MARY E BASSETT	779	492
10*14309	T	5-20-27	ROBERT B THOMAS	779	484
10*14310	T	5-20-27	JEAN C THOMAS	781	614
10*14324	T	5-20-27	RUTH E BASSETT MEADOWS	792	100
10*14325	T	5-20-27	ELIZABETH ANN STRAUSBAUGH	792	104
10*14326	T	5-20-27	JANET LEA BLANKENSHIP	792	580
10*14418	T	5-20-27	PPG INDUSTRIES, INC.	878	610



P.S. 708

David L Jackson



TUG HILL
OPERATING

OPERATOR'S
WELL #: HANSEN 3HU
DISTRICT: Franklin
COUNTY: Marshall
STATE: WV
API #: 47-051-01647

WELL PLAT
PAGE 3 OF 3
DATE: 01/26/2019
REVISED: 07/08/2019

WW-6A1
(5/13)

Operator's Well No. Hansen 3HU

**INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE
Chapter 22, Article 6A, Section 5(a)(5)
IN LIEU OF FILING LEASE(S) AND OTHER CONTINUING CONTRACT(S)**

Under the oath required to make the verification on page 1 of this Notice and Application, I depose and say that I am the person who signed the Notice and Application for the Applicant, and that –

- (1) the tract of land is the same tract described in this Application, partly or wholly depicted in the accompanying plat, and described in the Construction and Reclamation Plan;
- (2) the parties and recordation data (if recorded) for lease(s) or other continuing contract(s) by which the Applicant claims the right to extract, produce or market the oil or gas are as follows:

Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
-------------------------	-----------------------	-----------------------	---------	-----------


*See attached pages

**Acknowledgement of Possible Permitting/Approval
In Addition to the Office of Oil and Gas**

The permit applicant for the proposed well work addressed in this application hereby acknowledges the possibility of the need for permits and/or approvals from local, state, or federal entities in addition to the DEP, Office of Oil and Gas, including but not limited to the following:

- WV Division of Water and Waste Management
- WV Division of Natural Resources WV Division of Highways
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- County Floodplain Coordinator

The applicant further acknowledges that any Office of Oil and Gas permit in no way overrides, replaces, or nullifies the need for other permits/approvals that may be necessary and further affirms that all needed permits/approvals should be acquired from the appropriate authority before the affected activity is initiated.

Well Operator: Tug Hill Operating, LLC
 By: Amy L. Miller 
 Its: Permitting Specialist - Appalachia Region

4705101647 DD

WW-6A1 Supplement

Operator's Well No. Hansen N - 3HU

Lease No.	Tags	Parcel	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment
10*14418	A	5-27-22	PPG INDUSTRIES, INC.	GASTAR EXPLORATION INC	1/8+	878	610	NA	NA	NA	35/144 Gastar Exploration Inc to Atinum Marcellus I LLC	36/9 Gastar Exploration Inc to TH Exploration II, LLC
10*27022	B	5-27-21	COVESTRO LLC	TH EXPLORATION, LLC	1/8+	1046	431	NA	NA	NA	NA	NA
10*14609	C	5-27-23	PATRICIA M HADDIX	CHEESAPEAKE APPALACHIA LLC	1/8+	700	113	NA	23/512 Chesapeake Appalachia LLC to Statoil USA Onshore properties Inc	27/321 Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc and Atinum Marcellus I LLC	21/41 Gastar Exploration USA Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II LLC
10*14610	C	5-27-23	SUZANNE HILL	CHEESAPEAKE APPALACHIA LLC	1/8+	699	45	NA	23/479 Chesapeake Appalachia LLC to Statoil USA Onshore properties Inc	27/321 Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc and Atinum Marcellus I LLC	21/41 Gastar Exploration USA Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II LLC
10*14611	C	5-27-23	LILLIAN P GRIMM	CHEESAPEAKE APPALACHIA LLC	1/8+	699	41	NA	23/479 Chesapeake Appalachia LLC to Statoil USA Onshore properties Inc	27/321 Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc and Atinum Marcellus I LLC	21/41 Gastar Exploration USA Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II LLC
10*14418	D	5-28-8	PPG INDUSTRIES, INC.	GASTAR EXPLORATION INC	1/8+	878	610	NA	NA	NA	35/144 Gastar Exploration Inc to Atinum Marcellus I LLC	36/9 Gastar Exploration Inc to TH Exploration II, LLC

4705101647 DD

WW-6A1 Supplement

Operator's Well No. Hansen N - 3HU

10*14418	E	5-28-9	PPG INDUSTRIES, INC.	GASTAR EXPLORATION INC	1/8+	878	610	NA	NA	21/288 Central Michigan Exploration LLC to Stone Energy Corporation	21/356 Central Michigan Exploration LLC to Stone Energy Corporation corrected	NA	34/113 Stone Energy Corporation to Gastar Exploration USA, Inc and Atinum Marcellus I LLC	35/144 Gastar Exploration Inc to Atinum Marcellus I LLC	36/9 Gastar Exploration Inc to TH Exploration II, LLC
10*14565	F	5-28-10	HARRY LEE GOUDY	CENTRAL MICHIGAN EXPLORATION LLC	1/8+	670	59	NA	NA	21/288 Central Michigan Exploration LLC to Stone Energy Corporation	21/356 Central Michigan Exploration LLC to Stone Energy Corporation corrected	NA	34/113 Stone Energy Corporation to Gastar Exploration USA, Inc and Atinum Marcellus I LLC	21/41 Gastar Exploration USA, Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration USA Inc to TH Exploration II, LLC
10*14418	G	5-28-3	PPG INDUSTRIES, INC.	GASTAR EXPLORATION INC	1/8+	878	610	NA	NA	NA	NA	NA	35/144 Gastar Exploration Inc to Atinum Marcellus I LLC	36/9 Gastar Exploration Inc to TH Exploration II, LLC	
10*14482	G	5-28-3	RALPH EARNEST	GASTAR EXPLORATION USA, INC	1/8+	745	578	NA	NA	24/332 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	24/332 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Gastar Exploration USA, Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II, LLC		
10*14483	G	5-28-3	CHARLES H EARNEST	GASTAR EXPLORATION USA, INC	1/8+	746	319	NA	NA	24/332 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	24/332 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Gastar Exploration USA, Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II, LLC		
10*14484	G	5-28-3	ARTHUR L JOSEPH	GASTAR EXPLORATION USA, INC	1/8+	748	474	NA	NA	24/332 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	24/332 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Gastar Exploration USA, Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II, LLC		
10*14485	G	5-28-3	LINDA K HASSLEN	GASTAR EXPLORATION USA, INC	1/8+	748	476	NA	NA	24/332 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	24/332 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Gastar Exploration USA, Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II, LLC		
10*14486	G	5-28-3	THOMAS ATKINSON	GASTAR EXPLORATION USA, INC	1/8+	754	248	NA	NA	24/332 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	24/332 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Gastar Exploration USA, Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II, LLC		
10*14487	G	5-28-3	DOUGLAS ATKINSON	GASTAR EXPLORATION USA, INC	1/8+	754	577	NA	NA	24/332 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	24/332 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Gastar Exploration USA, Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II, LLC		

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Operator's Well No. Hansen N - 3HU

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10*14488	G	5-28-3	HEATHER GUIDRY	GASTAR EXPLORATION USA, INC	1/8+	754	244	NA	NA	24/332 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Gastar Exploration USA, Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II, LLC
10*14489	G	5-28-3	AUGUSTA L SPIHER	GASTAR EXPLORATION USA, INC	1/8+	754	246	NA	NA	24/332 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Gastar Exploration USA, Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II, LLC
10*14490	G	5-28-3	JAMES WELCH JR	GASTAR EXPLORATION USA, INC	1/8+	752	445	NA	NA	24/332 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Gastar Exploration USA, Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II, LLC
10*14491	G	5-28-3	CHRISTOPHER PRICE	GASTAR EXPLORATION USA, INC	1/8+	752	208	NA	NA	24/332 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Gastar Exploration USA, Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II, LLC
10*14492	G	5-28-3	MARJORIE A MCLAUGHLIN	GASTAR EXPLORATION USA, INC	1/8+	749	526	NA	NA	24/332 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Gastar Exploration USA, Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II, LLC
10*14937	H	5-22-13	JOHN M MOORE AND MELANIE A MOORE ETAL	GASTAR EXPLORATION INC	1/8+	850	524	NA	NA	34/302 Gastar Exploration Inc to Atinum Marcellus I LLC	36/9 Gastar Exploration Inc to TH Exploration II, LLC	
10*14418	I	5-22-12	PPG INDUSTRIES, INC.	GASTAR EXPLORATION INC	1/8+	878	610	NA	NA	35/144 Gastar Exploration Inc to Atinum Marcellus I LLC	36/9 Gastar Exploration Inc to TH Exploration II, LLC	
10*14937	J	5-21-18	JOHN M MOORE AND MELANIE A MOORE ETAL	GASTAR EXPLORATION INC	1/8+	850	524	NA	NA	34/302 Gastar Exploration Inc to Atinum Marcellus I LLC	36/9 Gastar Exploration Inc to TH Exploration II, LLC	
10*14937	K	5-21-20	JOHN M MOORE AND MELANIE A MOORE ETAL	GASTAR EXPLORATION INC	1/8+	850	524	NA	NA	34/302 Gastar Exploration Inc to Atinum Marcellus I LLC	36/9 Gastar Exploration Inc to TH Exploration II, LLC	

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10*14471	L	5-21-21	CNX GAS COMPANY LLC	TH EXPLORATION, LLC	1/8+	905	155	NA	NA	NA	NA	NA	NA	NA	NA	28/499 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	41/21 Gastar Exploration USA Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II, LLC 14418
10*14471	M	5-22-14	CNX GAS COMPANY LLC	TH EXPLORATION, LLC	1/8+	905	155	NA	NA	NA	NA	NA	NA	NA	NA	NA	35/144 Gastar Exploration Inc to Atinum Marcellus I LLC	36/9 Gastar Exploration Inc to TH Exploration II, LLC
10*14457	N	5-22-15	HARRY LEE GOUDY	GASTAR EXPLORATION USA, INC	1/8+	731	140	NA	NA	NA	NA	NA	NA	NA	NA	735/263 Gastar Exploration USA Inc to Atinum Marcellus I LLC	21/41 Gastar Exploration USA Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II, LLC
10*14457	O	5-22-18	HARRY LEE GOUDY	GASTAR EXPLORATION USA, INC	1/8+	731	140	NA	NA	NA	NA	NA	NA	NA	NA	735/263 Gastar Exploration USA Inc to Atinum Marcellus I LLC	21/41 Gastar Exploration USA Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II, LLC
10*14947	P	5-21-23	DANA SMALLWOOD	GASTAR EXPLORATION INC	1/8+	850	520	NA	NA	NA	NA	NA	NA	NA	NA	NA	34/302 Gastar Exploration Inc to Atinum Marcellus I LLC	36/9 Gastar Exploration Inc to TH Exploration II, LLC
10*14948	P	5-21-23	PEGGY L BROWN	GASTAR EXPLORATION INC	1/8+	850	522	NA	NA	NA	NA	NA	NA	NA	NA	NA	34/302 Gastar Exploration Inc to Atinum Marcellus I LLC	36/9 Gastar Exploration Inc to TH Exploration II, LLC
10*14947	Q	5-21-22	DANA SMALLWOOD	GASTAR EXPLORATION INC	1/8+	850	520	NA	NA	NA	NA	NA	NA	NA	NA	NA	34/302 Gastar Exploration Inc to Atinum Marcellus I LLC	36/9 Gastar Exploration Inc to TH Exploration II, LLC
10*14948	Q	5-21-22	PEGGY L BROWN	GASTAR EXPLORATION INC	1/8+	850	522	NA	NA	NA	NA	NA	NA	NA	NA	NA	34/302 Gastar Exploration Inc to Atinum Marcellus I LLC	36/9 Gastar Exploration Inc to TH Exploration II, LLC
10*14418	R	5-21-24	PPG INDUSTRIES, INC.	GASTAR EXPLORATION INC	1/8+	878	610	NA	NA	NA	NA	NA	NA	NA	NA	NA	35/144 Gastar Exploration Inc to Atinum Marcellus I LLC	36/9 Gastar Exploration Inc to TH Exploration II, LLC
10*14307	S	5-20-28	SALLY CVNTHIA HOPKINS	GASTAR EXPLORATION USA, INC	1/8+	777	572	NA	NA	NA	NA	NA	NA	NA	NA	28/499 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	41/21 Gastar Exploration USA Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II, LLC 14418

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10*14308	S	5-20-28	MARY E BASSETT	GASTAR EXPLORATION USA, INC	1/8+	779	492	NA	NA	28/499 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	41/21 Gastar Exploration USA Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II, LLC 14418
10*14309	S	5-20-28	ROBERT B THOMAS	GASTAR EXPLORATION USA, INC	1/8+	779	484	NA	NA	28/499 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	41/21 Gastar Exploration USA Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II, LLC 14418
10*14310	S	5-20-28	JEAN C THOMAS	GASTAR EXPLORATION USA, INC	1/8+	781	614	NA	NA	28/499 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	41/21 Gastar Exploration USA Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II, LLC 14418
10*14324	S	5-20-28	RUTH E BASSETT MEADOWS	GASTAR EXPLORATION USA, INC	1/8+	792	100	NA	NA	29/157 Gastar Exploration USA Inc to Atinum Marcellus I LLC	41/21 Gastar Exploration USA Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II, LLC 14418
10*14325	S	5-20-28	ELIZABETH ANN STRAUSBAUGH	GASTAR EXPLORATION USA, INC	1/8+	792	104	NA	NA	29/157 Gastar Exploration USA Inc to Atinum Marcellus I LLC	41/21 Gastar Exploration USA Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II, LLC 14418
10*14326	S	5-20-28	JANET LEA BLANKENSHIP	GASTAR EXPLORATION USA, INC	1/8+	792	580	NA	NA	30/136 Gastar Exploration USA Inc to Atinum Marcellus I LLC	41/21 Gastar Exploration USA Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II, LLC 14418
10*14418	S	5-20-28	PPG INDUSTRIES, INC.	GASTAR EXPLORATION INC	1/8+	878	610	NA	NA	35/144 Gastar Exploration Inc to Atinum Marcellus I LLC	36/9 Gastar Exploration Inc to TH Exploration II, LLC 14418	
10*14307	T	5-20-27	SALLY CNITHIA HOPKINS	GASTAR EXPLORATION USA, INC	1/8+	777	572	NA	NA	21/41 Gastar Exploration USA Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II, LLC 14419	
10*14308	T	5-20-27	MARY E BASSETT	GASTAR EXPLORATION USA, INC	1/8+	779	492	NA	NA	21/41 Gastar Exploration USA Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II, LLC 14420	

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Operator's Well No. Hansen N - 3HU

10*14309	T	5-20-27	ROBERT B THOMAS	GASTAR EXPLORATION USA, INC	1/8+	779	484	NA	NA	NA	NA	21/41 Gastar Exploration USA Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II, LLC 14421
10*14310	T	5-20-27	JEAN C THOMAS	GASTAR EXPLORATION USA, INC	1/8+	781	614	NA	NA	NA	NA	21/41 Gastar Exploration USA Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II, LLC 14422
10*14324	T	5-20-27	RUTH E BASSETT MEADOWS	GASTAR EXPLORATION USA, INC	1/8+	792	100	NA	NA	29/157 Gastar Exploration USA Inc to Atinum Marcellus I LLC	21/41 Gastar Exploration USA Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II, LLC	
10*14325	T	5-20-27	ELIZABETH ANN STRAUSBAUGH	GASTAR EXPLORATION USA, INC	1/8+	792	104	NA	NA	29/157 Gastar Exploration Inc to Atinum Marcellus I LLC	21/41 Gastar Exploration USA Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II, LLC	
10*14326	T	5-20-27	JANET LEA BLANKENSHIP	GASTAR EXPLORATION USA, INC	1/8+	792	580	NA	NA	30/136 Gastar Exploration Inc to Atinum Marcellus I LLC	21/41 Gastar Exploration USA Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II, LLC	
10*14418	T	5-20-27	PPG INDUSTRIES, INC.	GASTAR EXPLORATION INC	1/8+	878	610	NA	NA	NA	35/144 Gastar Exploration Inc to Atinum Marcellus I LLC	36/9 Gastar Exploration Inc to TH Exploration II, LLC	

AFFIDAVIT

COPY

STATE OF TEXAS §
§ SS
COUNTY OF TARRANT §

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On this 18th day of October, 2016, before me, the undersigned authority, personally appeared David D. Kalish ("Affiant") who being first duly sworn under oath, deposes and saith:

1. TH Exploration, LLC, TH Exploration II, LLC and TH Exploration III, LLC are wholly owned subsidiaries of THQ Appalachia I, LLC.
2. Tug Hill Operating, LLC provides oil and gas operations services to THQ Appalachia I, LLC under an Operating Services Agreement dated July 23, 2014.
3. David D. Kalish, the Affiant, is the Vice President of Tug Hill Operating, LLC, THQ Appalachia I, LLC, TH Exploration, LLC, TH Exploration II, LLC and TH Exploration III, LLC, and;
3. Tug Hill Operating, LLC is authorized to operate and maintain the assets owned by THQ Appalachia I, LLC, including, as referenced above, TH Exploration, LLC, TH Exploration II, LLC, and TH Exploration III, LLC, including oil and gas leases, wells, pipelines, surface facilities, and other all other assets that support the business of THQ Appalachia I, LLC, and;
4. Specifically, Tug Hill Operating, LLC is authorized to submit and obtain well work permits and carry out all activities pursuant to such work permits for assets owned by TH Exploration, LLC, TH Exploration II, LLC, TH Exploration III, LLC.

FURTHER, AFFIANT SAITH NOT.

IN WITNESS WHEREOF, we have hereunto set our hands and seals this 18th day of October, 2016.

David D. Kalish
Affiant: David D. Kalish

JURAT

Jan Pest
MARSHALL County 03:44:28 PM
Instrument No 1416299
Date Recorded 10/19/2016
Document Type MIS
Pages Recorded 1
Book-Page 28-62
Recording Fee \$5.00
Additional \$5.00

STATE OF TEXAS §
§ SS
COUNTY OF TARRANT §

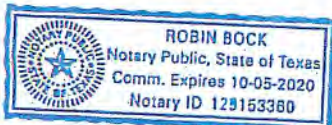
Sworn and subscribed to (or affirmed) before me on this, the 18th day of October, 2016, by David D. Kalish

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

My Commission Expires: 10-05-2020

Signature/Notary Public: Robin Bock

Name/Notary Public (Print): Robin Bock



Jan Pest
MARSHALL County 01:22:39 PM
Instrument No 1403489
Date Recorded 04/27/2016
Document Type ABN
Pages Recorded 77
Book Page 36-9
Recording Fee \$77.00
Additional \$13.00

WHEN RECORDED RETURN TO:
TH Exploration II, LLC
1320 South University Drive, Suite 500
Fort Worth, Texas 76107
Attn: David Kalish

470510164700

Execution Version

ASSIGNMENT AND BILL OF SALE

STATE OF WV

COUNTY OF MARSHALL

KNOW ALL MEN BY THESE PRESENTS:

THIS ASSIGNMENT AND BILL OF SALE (this "Assignment"), dated April 7, 2016, but effective as of 7:00 A.M. Houston time on January 1, 2016 (the "Effective Time"), is between Gasar Exploration Inc., a Delaware corporation, whose address is 1331 Lamar Street, Suite 650 Houston, Texas 77010 ("Assignor"), and TH Exploration II, LLC, a Texas limited liability company, whose address is 1320 South University Drive, Suite 500, Fort Worth, Texas 76107 ("Assignee"). Assignor and Assignee are each, individually, referred to herein as a "Party" and, collectively, as the "Parties".

Capitalized terms used but not defined herein shall have the respective meanings set forth in that certain Purchase and Sale Agreement (the "Purchase Agreement"), dated as of February 19, 2016, by and between Assignor and Assignee (as successor-in-interest).

Section 1. Assignment. The conveyance and assignment herein shall be deemed effective as of the Effective Time.

For Ten Dollars (\$10.00) and other good and valuable consideration (the receipt and sufficiency of which are hereby acknowledged), Assignor does hereby forever GRANT, BARGAIN, SELL, CONVEY, ASSIGN, TRANSFER, SET OVER AND DELIVER unto Assignee, all of Assignor's right, title and interest in and to the following interests and properties (such right, title and interest described in subsections (a) through (b) of this Section 1, less and except the Excluded Assets, collectively, the "Conveyed Interests");

(a) all oil, gas and/or mineral leases of Assignor, together with any and all other right, title and interest of Assignor in and to the leasehold estates created thereby, including subleases, royalties, overriding royalties, net profits interest, carried interests or similar rights or interests in such leases, and together with all rights, privileges, benefits and powers conferred upon Assignor with respect to the use and occupation of the lands covered thereby that may be necessary, convenient or incidental to the possession and enjoyment of such leases, located in Marshall, Wetzal, Doddridge, Harrison, Lewis, Marion, and Monongalia Counties, West Virginia and Greene, Butler, Fayette, Somerset, and Clearfield Counties, Pennsylvania, including those described on Exhibit A—Part 1 attached hereto (subject to any reservations, limitations or depth restrictions described on Exhibit A—Part 1), (Assignor's interest in such leases and other right, title and interest as so limited, the "Leases");

(b) all rights and interests in, under or derived from all unitization agreements in effect with respect to any of the Leases and the units created thereby, including those described



January 24, 2019

WV Department of Environmental Protection
Office of Oil & Gas
601 57th Street, SE
Charleston, WV 25304
Attention: Laura Adkins

RE: Hansen 3HU

Subject: Marshall County Route 78, and 2/2 Road Crossing Letter

Dear Laura:

Tug Hill Operating, LLC (THO) hereby submits this letter as confirmation that THO has obtained the right to drill, extract and produce the minerals under Marshall County Route 78, and 2/2 in the area reflected on the Hansen 3HU well plat. THO has conducted a full title search in the relevant Court House to confirm its ownership under said County Routes and is not currently aware of any recorded document that would suggest an ownership other than THO.

If your office has any questions or concerns regarding the contents of this letter, please do not hesitate to contact me directly at 304-376-0111, or by email at amiller@tug-hilop.com.

Sincerely,

A handwritten signature in blue ink that reads "Amy L. Miller".

Amy L. Miller
Permitting Specialist – Appalachia Region

Received
JAN 28 2019
Office of Oil and Gas
WV Dept. of Environmental Protection

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
NOTICE CERTIFICATION

Date of Notice Certification: 01/25/2019

API No. 47- 051 - 01047 DD

Operator's Well No. Hansen 3HU

Well Pad Name: Hansen

Notice has been given:

Pursuant to the provisions in West Virginia Code § 22-6A, the Operator has provided the required parties with the Notice Forms listed below for the tract of land as follows:

State:	<u>West Virginia</u>	UTM NAD 83	Easting:	<u>515,915.53</u>
County:	<u>Marshall</u>		Northing:	<u>4,397,436.04</u>
District:	<u>Franklin</u>	Public Road Access:	<u>County Route 2/2 - Wells Hill Road</u>	
Quadrangle:	<u>New Martinsville 7.5'</u>	Generally used farm name:	<u>Covestro, LLC</u>	
Watershed:	<u>French Creek - Ohio River</u>			

Pursuant to West Virginia Code § 22-6A-7(b), every permit application filed under this section shall be on a form as may be prescribed by the secretary, shall be verified and shall contain the following information: (14) A certification from the operator that (i) it has provided the owners of the surface described in subdivisions (1), (2) and (4), subsection (b), section ten of this article, the information required by subsections (b) and (c), section sixteen of this article; (ii) that the requirement was deemed satisfied as a result of giving the surface owner notice of entry to survey pursuant to subsection (a), section ten of this article six-a; or (iii) the notice requirements of subsection (b), section sixteen of this article were waived in writing by the surface owner; and Pursuant to West Virginia Code § 22-6A-11(b), the applicant shall tender proof of and certify to the secretary that the notice requirements of section ten of this article have been completed by the applicant.

<p>Pursuant to West Virginia Code § 22-6A, the Operator has attached proof to this Notice Certification that the Operator has properly served the required parties with the following:</p> <p>*PLEASE CHECK ALL THAT APPLY</p> <p><input type="checkbox"/> 1. NOTICE OF SEISMIC ACTIVITY or <input checked="" type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NO SEISMIC ACTIVITY WAS CONDUCTED</p> <p><input checked="" type="checkbox"/> 2. NOTICE OF ENTRY FOR PLAT SURVEY or <input type="checkbox"/> NO PLAT SURVEY WAS CONDUCTED</p> <p><input type="checkbox"/> 3. NOTICE OF INTENT TO DRILL or <input checked="" type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NOTICE OF ENTRY FOR PLAT SURVEY WAS CONDUCTED</p> <p style="padding-left: 100px;"><input type="checkbox"/> WRITTEN WAIVER BY SURFACE OWNER (PLEASE ATTACH)</p> <p><input checked="" type="checkbox"/> 4. NOTICE OF PLANNED OPERATION</p> <p><input checked="" type="checkbox"/> 5. PUBLIC NOTICE</p> <p><input checked="" type="checkbox"/> 6. NOTICE OF APPLICATION</p>	<p>OOG OFFICE USE ONLY</p> <p><input type="checkbox"/> RECEIVED/ NOT REQUIRED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED/ NOT REQUIRED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED</p>
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Received
JAN 28 2019

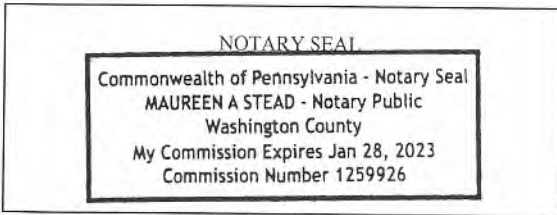
Required Attachments:

The Operator shall attach to this Notice Certification Form all Notice Forms and Certifications of Notice that have been provided to the required parties and/or any associated written waivers. For the Public Notice, the operator shall attach a copy of the Class II Legal Advertisement with publication date verification or the associated Affidavit of Publication. The attached Notice Forms and Certifications of Notice shall serve as proof that the required parties have been noticed as required under West Virginia Code § 22-6A. Pursuant to West Virginia Code § 22-6A-11(b), the Certification of Notice to the person may be made by affidavit of personal service, the return receipt card or other postal receipt for certified mailing.

Certification of Notice is hereby given:

THEREFORE, I Amy L. Miller, have read and understand the notice requirements within West Virginia Code § 22-6A. I certify that as required under West Virginia Code § 22-6A, I have served the attached copies of the Notice Forms, identified above, to the required parties through personal service, by registered mail or by any method of delivery that requires a receipt or signature confirmation. I certify under penalty of law that I have personally examined and am familiar with the information submitted in this Notice Certification and all attachments, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Well Operator:	<u>Tug Hill Operating, LLC</u>	Address:	<u>380 Southpointe Boulevard, Plaza II, Suite 200</u>
By:	<u>Amy L. Miller <i>amyx Miller</i></u>		<u>Canonsburg, PA 15317</u>
Its:	<u>Permitting Specialist - Appalachia Region</u>	Facsimile:	<u>724-338-2830</u>
Telephone:	<u>724-749-8388</u>	Email:	<u>amiller@tug-hill.com</u>



Subscribed and sworn before me this 25 day of JANUARY, 2019
Maureen A Stead Notary Public
 My Commission Expires 1/28/23

Oil and Gas Privacy Notice:

The Office of Oil and Gas processes your personal information, such as name, address and telephone number, as part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use or your personal information, please contact DEP's Chief Privacy Officer at depprivacyofficer@wv.gov.



WW-6A
(9-13)

API NO. 47- 051 - 01047 DD
OPERATOR WELL NO. Hansen 3HU
Well Pad Name: Hansen

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
NOTICE OF APPLICATION

Notice Time Requirement: notice shall be provided no later than the **filing date of permit application.**

Date of Notice: 1/24/2019 **Date Permit Application Filed:** 1/25/2019

Notice of:

- PERMIT FOR ANY WELL WORK CERTIFICATE OF APPROVAL FOR THE CONSTRUCTION OF AN IMPOUNDMENT OR PIT

Delivery method pursuant to West Virginia Code § 22-6A-10(b)

- PERSONAL SERVICE REGISTERED MAIL METHOD OF DELIVERY THAT REQUIRES A RECEIPT OR SIGNATURE CONFIRMATION

Pursuant to W. Va. Code § 22-6A-10(b) no later than the filing date of the application, the applicant for a permit for any well work or for a certificate of approval for the construction of an impoundment or pit as required by this article shall deliver, by personal service or by registered mail or by any method of delivery that requires a receipt or signature confirmation, copies of the application, the erosion and sediment control plan required by section seven of this article, and the well plat to each of the following persons: (1) The owners of record of the surface of the tract on which the well is or is proposed to be located; (2) The owners of record of the surface tract or tracts overlying the oil and gas leasehold being developed by the proposed well work, if the surface tract is to be used for roads or other land disturbance as described in the erosion and sediment control plan submitted pursuant to subsection (c), section seven of this article; (3) The coal owner, operator or lessee, in the event the tract of land on which the well proposed to be drilled is located [sic] is known to be underlain by one or more coal seams; (4) The owners of record of the surface tract or tracts overlying the oil and gas leasehold being developed by the proposed well work, if the surface tract is to be used for the placement, construction, enlargement, alteration, repair, removal or abandonment of any impoundment or pit as described in section nine of this article; (5) Any surface owner or water purveyor who is known to the applicant to have a water well, spring or water supply source located within one thousand five hundred feet of the center of the well pad which is used to provide water for consumption by humans or domestic animals; and (6) The operator of any natural gas storage field within which the proposed well work activity is to take place. (c)(1) If more than three tenants in common or other co-owners of interests described in subsection (b) of this section hold interests in the lands, the applicant may serve the documents required upon the person described in the records of the sheriff required to be maintained pursuant to section eight, article one, chapter eleven-a of this code. (2) Notwithstanding any provision of this article to the contrary, notice to a lien holder is not notice to a landowner, unless the lien holder is the landowner. W. Va. Code R. § 35-8-5.7.a requires, in part, that the operator shall also provide the Well Site Safety Plan ("WSSP") to the surface owner and any water purveyor or surface owner subject to notice and water testing as provided in section 15 of this rule.

Application Notice WSSP Notice E&S Plan Notice Well Plat Notice is hereby provided to:

SURFACE OWNER(s)
Name: Covestro, LLC Attn: Tax Department (Well Pad and Access Road)
Address: 1 Covestro Circle
Pittsburgh, PA 15205

Name: _____
Address: _____

SURFACE OWNER(s) (Road and/or Other Disturbance)
Name: _____
Address: _____

Name: _____
Address: _____

SURFACE OWNER(s) (Impoundments or Pits)
Name: _____
Address: _____

COAL OWNER OR LESSEE
Name: CONSOL Energy, LLC Attn: Casey Saunders
Address: 1000 CONSOL Energy Drive
Canonsburg, PA 15317

COAL OPERATOR
Name: _____
Address: _____

SURFACE OWNER OF WATER WELL AND/OR WATER PURVEYOR(s)
Name: none
Address: _____

OPERATOR OF ANY NATURAL GAS STORAGE FIELD
Name: _____
Address: _____

*Please attach additional forms if necessary

RECEIVED
 JAN 28 2019
 DEPARTMENT OF ENVIRONMENTAL PROTECTION
 OFFICE OF OIL AND GAS

Notice is hereby given:

Pursuant to West Virginia Code § 22-6A-10(b), notice is hereby given that the undersigned well operator has applied for a permit for well work or for a certificate of approval for the construction of an impoundment or pit.

This Notice Shall Include:

Pursuant to W. Va. Code § 22-6A-10(b), this notice shall include: (1) copies of the application; (2) the erosion and sediment control plan required by section seven of this article; and (3) the well plat.

Pursuant to W. Va. Code § 22-6A-10(f), this notice shall include: (1) a statement of the time limits for filing written comments; (2) who may file written comments; (3) the name and address of the secretary for the purpose of filing the comments and obtaining additional information; and (4) a statement that the persons may request, at the time of submitting written comments, notice of the permit decision and a list of persons qualified to test water.

Pursuant to W. Va. Code R. § 35-8-5.7.a, the operator shall provide the Well Site Safety Plan to the surface owner and any water purveyor or surface owner subject to notice and water testing as provided in section 15 of this rule.

Pursuant to W. Va. Code R. § 35-8-15.2.c, this notice shall: (1) contain a statement of the surface owner's and water purveyor's right to request sampling and analysis; (2) advise the surface owner and water purveyor of the rebuttable presumption for contamination or deprivation of a fresh water source or supply; advise the surface owner and water purveyor that refusal to allow the operator to conduct a pre-drilling water well test constitutes a method to rebut the presumption of liability; (3) advise the surface owner and water purveyor of his or her independent right to sample and analyze any water supply at his or her own expense; advise the surface owner and water purveyor whether or not the operator will utilize an independent laboratory to analyze any sample; and (4) advise the surface owner and or water purveyor that he or she can obtain from the Chief a list of water testing laboratories in the subject area capable of and qualified to test water supplies in accordance with standard acceptable methods.

Additional information related to horizontal drilling may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57th Street, SE, Charleston, WV 25304 (304-926-0450) or by visiting www.dep.wv.gov/oil-and-gas/pages/default.aspx.

Well Location Restrictions

Pursuant to W. Va. Code § 22-6A-12, Wells may not be drilled within two hundred fifty feet measured horizontally from any existing water well or developed spring used for human or domestic animal consumption. The center of well pads may not be located within six hundred twenty-five feet of an occupied dwelling structure, or a building two thousand five hundred square feet or larger used to house or shelter dairy cattle or poultry husbandry. This limitation is applicable to those wells, developed springs, dwellings or agricultural buildings that existed on the date a notice to the surface owner of planned entry for surveying or staking as provided in section ten of this article or a notice of intent to drill a horizontal well as provided in subsection (b), section sixteen of this article was provided, whichever occurs first, and to any dwelling under construction prior to that date. This limitation may be waived by written consent of the surface owner transmitted to the department and recorded in the real property records maintained by the clerk of the county commission for the county in which such property is located. Furthermore, the well operator may be granted a variance by the secretary from these distance restrictions upon submission of a plan which identifies the sufficient measures, facilities or practices to be employed during well site construction, drilling and operations. The variance, if granted, shall include terms and conditions the department requires to ensure the safety and protection of affected persons and property. The terms and conditions may include insurance, bonding and indemnification, as well as technical requirements. (b) No well pad may be prepared or well drilled within one hundred feet measured horizontally from any perennial stream, natural or artificial lake, pond or reservoir, or a wetland, or within three hundred feet of a naturally reproducing trout stream. No well pad may be located within one thousand feet of a surface or ground water intake of a public water supply. The distance from the public water supply as identified by the department shall be measured as follows: (1) For a surface water intake on a lake or reservoir, the distance shall be measured from the boundary of the lake or reservoir. (2) For a surface water intake on a flowing stream, the distance shall be measured from a semicircular radius extending upstream of the surface water intake. (3) For a groundwater source, the distance shall be measured from the wellhead or spring. The department may, in its discretion, waive these distance restrictions upon submission of a plan identifying sufficient measures, facilities or practices to be employed during well site construction, drilling and operations to protect the waters of the state. A waiver, if granted, shall impose any permit conditions as the secretary considers necessary. (c) Notwithstanding the foregoing provisions of this section, nothing contained in this section prevents an operator from conducting the activities permitted or authorized by a Clean Water Act Section 404 permit or other approval from the United States Army Corps of Engineers within any waters of the state or within the restricted areas referenced in this section. (d) The well location restrictions set forth in this section shall not apply to any well on a multiple well pad if at least one of the wells was permitted prior to the effective date of this article. (e) The secretary shall, by December 31, 2012, report to the Legislature on the noise, light, dust and volatile organic compounds generated by the drilling of horizontal wells as they relate to the well location restrictions regarding occupied dwelling structures pursuant to this section. Upon a finding, if any, by the secretary that the well location restrictions regarding occupied dwelling structures are inadequate or otherwise require alteration to address the items

examined in the study required by this subsection, the secretary shall have the authority to propose for promulgation legislative rules establishing guidelines and procedures regarding reasonable levels of noise, light, dust and volatile organic compounds relating to drilling horizontal wells, including reasonable means of mitigating such factors, if necessary.

Water Well Testing:

Pursuant to West Virginia Code § 22-6A-10(d), notification shall be made, with respect to surface landowners identified in subsection (b) or water purveyors identified in subdivision (5), subsection (b) of this section, of the opportunity for testing their water well. The operator shall provide an analysis to such surface landowner or water purveyor at their request.

Water Testing Laboratories:

Pursuant to West Virginia Code § 22-6A-10(i), persons entitled to notice pursuant to subsection (b) of this section may contact the department to ascertain the names and locations of water testing laboratories in the subject area capable and qualified to test water supplies in accordance with standard accepted methods. In compiling that list of names the department shall consult with the state Bureau for Public Health and local health departments. A surface owner and water purveyor has an independent right to sample and analyze any water supply at his or her own expense. The laboratory utilized by the operator shall be approved by the agency as being certified and capable of performing sample analyses in accordance with this section.

Rebuttable Presumption for Contamination or Deprivation of a Fresh Water Source or Supply:

W. Va. Code § 22-6A-18 requires that (b) unless rebutted by one of the defenses established in subsection (c) of this section, in any action for contamination or deprivation of a fresh water source or supply within one thousand five hundred feet of the center of the well pad for horizontal well, there is a rebuttable presumption that the drilling and the oil or gas well or either was the proximate cause of the contamination or deprivation of the fresh water source or supply. (c) In order to rebut the presumption of liability established in subsection (b) of this section, the operator must prove by a preponderance of the evidence one of the following defenses: (1) The pollution existed prior to the drilling or alteration activity as determined by a predrilling or prealteration water well test. (2) The landowner or water purveyor refused to allow the operator access to the property to conduct a predrilling or prealteration water well test. (3) The water supply is not within one thousand five hundred feet of the well. (4) The pollution occurred more than six months after completion of drilling or alteration activities. (5) The pollution occurred as the result of some cause other than the drilling or alteration activity. (d) Any operator electing to preserve its defenses under subdivision (1), subsection (c) of this section shall retain the services of an independent certified laboratory to conduct the predrilling or prealteration water well test. A copy of the results of the test shall be submitted to the department and the surface owner or water purveyor in a manner prescribed by the secretary. (e) Any operator shall replace the water supply of an owner of interest in real property who obtains all or part of that owner's supply of water for domestic, agricultural, industrial or other legitimate use from an underground or surface source with a comparable water supply where the secretary determines that the water supply has been affected by contamination, diminution or interruption proximately caused by the oil or gas operation, unless waived in writing by that owner. (f) The secretary may order the operator conducting the oil or gas operation to: (1) Provide an emergency drinking water supply within twenty-four hours; (2) Provide temporary water supply within seventy-two hours; (3) Within thirty days begin activities to establish a permanent water supply or submit a proposal to the secretary outlining the measures and timetables to be used in establishing a permanent supply. The total time in providing a permanent water supply may not exceed two years. If the operator demonstrates that providing a permanent replacement water supply cannot be completed within two years, the secretary may extend the time frame on case-by-case basis; and (4) Pay all reasonable costs incurred by the real property owner in securing a water supply. (g) A person as described in subsection (b) of this section aggrieved under the provisions of subsections (b), (e) or (f) of this section may seek relief in court... (i) Notwithstanding the denial of the operator of responsibility for the damage to the real property owner's water supply or the status of any appeal on determination of liability for the damage to the real property owner's water supply, the operator may not discontinue providing the required water service until authorized to do so by the secretary or a court of competent jurisdiction.

Written Comment:

Pursuant to West Virginia Code § 22-6A-11(a), all persons described in subsection (b), section ten of this article may file written comments with the secretary as to the location or construction of the applicant's proposed well work within thirty days after the application is filed with the secretary. All persons described in West Virginia Code § 22-6A-10(b) may file written comments as to the location or construction of the applicant's proposed well work to the Secretary at:

Chief, Office of Oil and Gas
Department of Environmental Protection
601 57th St. SE
Charleston, WV 25304
(304) 926-0450

Such persons may request, at the time of submitting written comments, notice of the permit decision and a list of persons qualified to test water. **NOTE: YOU ARE NOT REQUIRED TO FILE ANY COMMENT.**

Time Limits and Methods for Filing Comments.

The law requires these materials to be served on or before the date the operator files its Application. You have **THIRTY (30) DAYS** after the filing date to file your comments. Comments must be filed in person or received in the mail by the Chief's office by the time stated above. You may call the Chief's office to be sure of the date. Check with your postmaster to ensure adequate delivery time or to arrange special expedited handling. If you have been contacted by the well operator and you have signed a "voluntary statement of no objection" to the planned work described in these materials, then the permit may be issued at any time.

Pursuant to West Virginia Code § 22-6A-11(c)(2), Any objections of the affected coal operators and coal seam owners and lessees shall be addressed through the processes and procedures that exist under sections fifteen, seventeen and forty, article six of this chapter, as applicable and as incorporated into this article by section five of this article. The written comments filed by the parties entitled to notice under subdivisions (1), (2), (4), (5) and (6), subsection (b), section ten of this article shall be considered by the secretary in the permit issuance process, but the parties are not entitled to participate in the processes and proceedings that exist under sections fifteen, seventeen or forty, article six of this chapter, as applicable and as incorporated into this article by section five of this article.

Comment Requirements

Your comments must be in writing and include your name, address and telephone number, the well operator's name and well number and the approximate location of the proposed well site including district and county from the application. You may add other documents, such as sketches, maps or photographs to support your comments.

Disclaimer: All comments received will be placed on our web site <http://www.dep.wv.gov/oil-and-gas/Horizontal-Permits/Pages/default.aspx> and the applicant will automatically be forwarded an email notice that such comments have been submitted. The applicant will be expected to provide a response to comments submitted by any surface owner, water purveyor or natural gas storage operator noticed within the application.

Permit Denial or Condition

The Chief has the power to deny or condition a well work permit. Pursuant to West Virginia Code § 22-6A-8(d), the permit may not be issued or be conditioned, including conditions with respect to the location of the well and access roads prior to issuance if the director determines that:

- (1) The proposed well work will constitute a hazard to the safety of persons;
- (2) The plan for soil erosion and sediment control is not adequate or effective;
- (3) Damage would occur to publicly owned lands or resources; or
- (4) The proposed well work fails to protect fresh water sources or supplies.

A permit may also be denied under West Virginia Code § 22-6A-7(k), the secretary shall deny the issuance of a permit if the secretary determines that the applicant has committed a substantial violation of a previously issued permit for a horizontal well, including the applicable erosion and sediment control plan associated with the previously issued permit, or a substantial violation of one or more of the rules promulgated under this article, and in each instance has failed to abate or seek review of the violation within the time prescribed by the secretary pursuant to the provisions of subdivisions (1) and (2), subsection (a), section five of this article and the rules promulgated hereunder, which time may not be unreasonable.

Pursuant to West Virginia Code § 22-6A-10(g), any person entitled to submit written comments to the secretary pursuant to subsection (a), section eleven of this article, shall also be entitled to receive from the secretary a copy of the permit as issued or a copy of the order modifying or denying the permit if the person requests receipt of them as a part of the written comments submitted concerning the permit application. Such persons may request, at the time of submitting written comments, notice of the permit decision and a list of persons qualified to test water.

JAN 27 2011
6:00 PM

WW-6A
(8-13)

API NO. 47-051 - 01647 DD
OPERATOR WELL NO. Hansen 3HU
Well Pad Name: Hansen

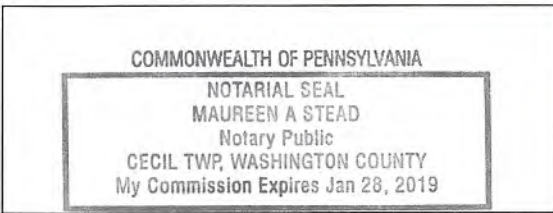
Notice is hereby given by:

Well Operator: Tug Hill Operating, LLC
Telephone: 724-749-8388
Email: amiller@tug-hillop.com *amiller*

Address: 380 Southpointe Boulevard, Plaza II, Suite 200
Canonsburg, PA 15317
Facsimile: 724-338-2030

Oil and Gas Privacy Notice:

The Office of Oil and Gas processes your personal information, such as name, address and telephone number, as part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use or your personal information, please contact DEP's Chief Privacy Officer at deprivacyofficer@wv.gov.



Subscribed and sworn before me this 23 day of JANUARY 2019
Maureen A Stead Notary Public
My Commission Expires 1/28/19

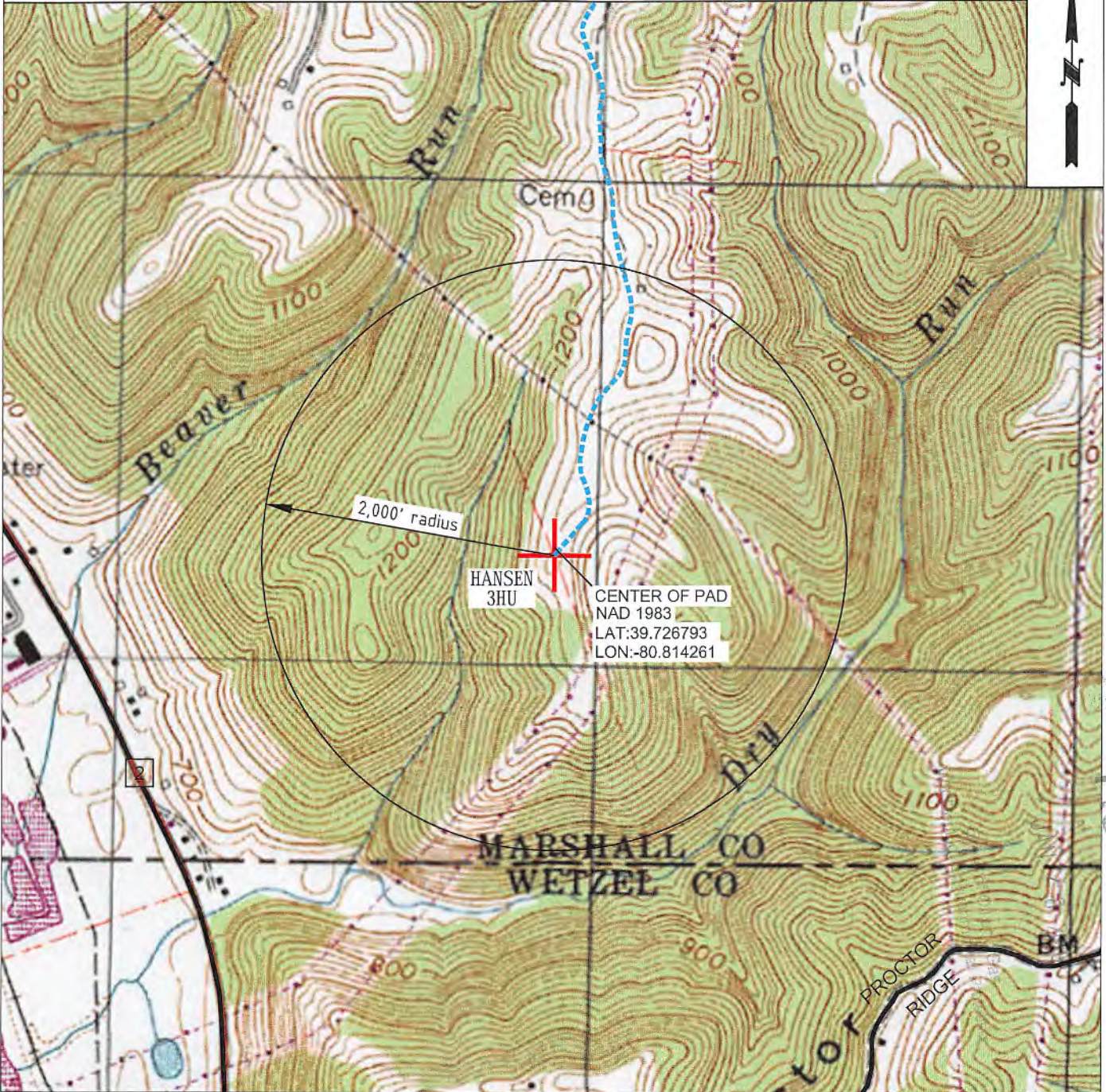
Received
JAN 28 2019
Office of Oil and Gas
WV Dept. of Environmental Protection

WW-6A


PROPOSED
HANSEN 3HU #47-051-01647

SUPPLEMENT PG 1

There appears to be zero (0) possible water sources within 2,000'.



Received

 TUG HILL OPERATING	OPERATOR	494510851	TOPO SECTION	LEASE NAME
	TUG HILL OPERATING, LLC 380 SOUTHPOINTE BLVD SUITE 200 CANONSBURG, PA 15317		NEW MARTINSVILLE 7.5'	HANSEN
	SCALE:		1" = 1000'	DATE:
				DATE: 01/17/2019

470510164700

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
NOTICE OF ENTRY FOR PLAT SURVEY

Notice Time Requirement: Notice shall be provided at least **SEVEN (7)** days but no more than **FORTY-FIVE (45)** days prior to entry

Date of Notice: 1/7/2018 **Date of Planned Entry:** 1/14/2018

Delivery method pursuant to West Virginia Code § 22-6A-10a

- PERSONAL SERVICE
- REGISTERED MAIL
- METHOD OF DELIVERY THAT REQUIRES A RECEIPT OR SIGNATURE CONFIRMATION

Pursuant to West Virginia Code § 22-6A-10(a), Prior to filing a permit application, the operator shall provide notice of planned entry on to the surface tract to conduct any plat surveys required pursuant to this article. Such notice shall be provided at least seven days but no more than forty-five days prior to such entry to: (1) The surface owner of such tract; (2) to any owner or lessee of coal seams beneath such tract that has filed a declaration pursuant to section thirty-six, article six, chapter twenty-two of this code; and (3) any owner of minerals underlying such tract in the county tax records. The notice shall include a statement that copies of the state Erosion and Sediment Control Manual and the statutes and rules related to oil and gas exploration and production may be obtained from the Secretary, which statement shall include contact information, including the address for a web page on the Secretary's web site, to enable the surface owner to obtain copies from the secretary.

Notice is hereby provided to:

SURFACE OWNER(s)

Name: Covestro, LLC, Attn: Tax Department (Well Pad and Access Road)
Address: 1 Covestro Circle
Pittsburgh, PA 15205

Name: _____
Address: _____

Name: _____
Address: _____

COAL OWNER OR LESSEE

Name: CONSOL Energy, LLC Attn: Casey Saunders
Address: 1000 CONSOL Energy Drive
Canonsburg, PA 15317

MINERAL OWNER(s)

Name: TH Exploration III, LLC Attn: David Kalish
Address: 1320 S. University Drive, Suite 500
Ft. Worth, TX 76107

*please attach additional forms if necessary

Received
JAN 28 2019
Division of Environmental Protection
West Virginia Department of Environmental Protection

Notice is hereby given:

Pursuant to West Virginia Code § 22-6A-10(a), notice is hereby given that the undersigned well operator is planning entry to conduct a plat survey on the tract of land as follows:

State: West Virginia
County: Marshall
District: Franklin
Quadrangle: New Martinsville 7.5'

Approx. Latitude & Longitude: 39.4336.5; -80.4851.3
Public Road Access: Wells Hill Lane (CR 2/2)
Watershed: French Creek - Ohio River
Generally used farm name: Covestro, LLC

Copies of the state Erosion and Sediment Control Manual and the statutes and rules related to oil and gas exploration and production may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57th Street, SE, Charleston, WV 25304 (304-926-0450). Copies of such documents or additional information related to horizontal drilling may be obtained from the Secretary by visiting www.dep.wv.gov/oil-and-gas/pages/default.aspx.

Notice is hereby given by:

Well Operator: Tug Hill Operating, LLC
Telephone: 724-749-8388
Email: amiller@tug-hillop.com

Address: 380 Southpointe Boulevard, Plaza II, Suite 200
Canonsburg, PA 15317
Facsimile: 724-338-2030

Oil and Gas Privacy Notice:

The Office of Oil and Gas processes your personal information, such as name, address and telephone number, as part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use or your personal information, please contact DEP's Chief Privacy Officer at depprivacyofficer@wv.gov.

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
NOTICE OF PLANNED OPERATION

Notice Time Requirement: notice shall be provided no later than the **filing date of permit application.**

Date of Notice: 01/24/2019 **Date Permit Application Filed:** 01/25/2019

Delivery method pursuant to West Virginia Code § 22-6A-16(c)

- CERTIFIED MAIL HAND
RETURN RECEIPT REQUESTED DELIVERY

Pursuant to W. Va. Code § 22-6A-16(c), no later than the date for filing the permit application, an operator shall, by certified mail return receipt requested or hand delivery, give the surface owner whose land will be used for the drilling of a horizontal well notice of the planned operation. The notice required by this subsection shall include: (1) A copy of this code section; (2) The information required to be provided by subsection (b), section ten of this article to a surface owner whose land will be used in conjunction with the drilling of a horizontal well; and (3) A proposed surface use and compensation agreement containing an offer of compensation for damages to the surface affected by oil and gas operations to the extent the damages are compensable under article six-b of this chapter. (d) The notices required by this section shall be given to the surface owner at the address listed in the records of the sheriff at the time of notice.

Notice is hereby provided to the SURFACE OWNER(s)

(at the address listed in the records of the sheriff at the time of notice):

Name: Covestro, LLC Attn: Tax Department (Well Pad and Access Road)
Address: 1 Covestro Circle
Pittsburgh, PA 15205

Name: _____
Address: _____

Notice is hereby given:

Pursuant to West Virginia Code § 22-6A-16(c), notice is hereby given that the undersigned well operator has developed a planned operation on the surface owner's land for the purpose of drilling a horizontal well on the tract of land as follows:

State:	<u>West Virginia</u>	UTM NAD 83	Easting:	<u>515,915.53</u>
County:	<u>Marshall</u>		Northing:	<u>4,397,436.04</u>
District:	<u>Franklin</u>	Public Road Access:	<u>County Route 2/2 - Wells Hill Road</u>	
Quadrangle:	<u>New Martinsville 7.5'</u>	Generally used farm name:	<u>Covestro, LLC</u>	
Watershed:	<u>French Creek - Ohio River</u>			

This Notice Shall Include:

Pursuant to West Virginia Code § 22-6A-16(c), this notice shall include: (1) A copy of this code section; (2) The information required to be provided by **W. Va. Code § 22-6A-10(b)** to a surface owner whose land will be used in conjunction with the drilling of a horizontal well; and (3) A proposed surface use and compensation agreement containing an offer of compensation for damages to the surface affected by oil and gas operations to the extent the damages are compensable under article six-b of this chapter. Additional information related to horizontal drilling may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57th Street, SE, Charleston, WV 25304 (304-926-0450) or by visiting www.dep.wv.gov/oil-and-gas/pages/default.aspx.

Well Operator: Tug Hill Operating, LLC
Telephone: 724-749-8388
Email: amiller@tug-hillop.com

Address: 380 Southpointe Boulevard, Plaza II, Suite 200
Canonsburg, PA 15317
Facsimile: 724-338-2030

Oil and Gas Privacy Notice:

The Office of Oil and Gas processes your personal information, such as name, address and telephone number, as part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use or your personal information, please contact DEP's Chief Privacy Officer at depprivacyofficer@wv.gov.



WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

Division of Highways1900 Kanawha Boulevard East • Building Five • Room 110
Charleston, West Virginia 25305-0430 • (304) 558-3505Thomas J. Smith, P. E.
Secretary of Transportation/
Commissioner of Highways

January 24, 2019

Jill M. Newman
Deputy CommissionerJames A. Martin, Chief
Office of Oil and Gas
Department of Environmental Protection
601 57th Street, SE
Charleston, WV 25304Subject: DOH Permit for the Hansen Pad, Marshall County
Hansen 3HU Well site

Dear Mr. Martin,

This well site will be accessed from a DOH permits #06-2017-0178 which have been issued to Tug Hill Operating, LLC for access to the State Road for a well site located off of Marshall County Route 2/2 SLS.

The operator has signed a STATEWIDE OIL AND GAS ROAD MAINTENANCE BONDING AGREEMENT and provided the required Bond. This operator is currently in compliance with the DOH OIL AND GAS POLICY dated October 1, 2018.

Very Truly Yours,

Handwritten signature of Gary K. Clayton in blue ink.

Gary K. Clayton, P.E.
Regional Maintenance Engineer
Central Office O&G CoordinatorCc: Amy Miller
Tug Hill Operating, LLC
CH, OM, D-6
File



TUG HILL 4705101647 DD

PLANNED ADDITIVES TO BE USED IN FRACTURING OR STIMULATION

PRODUCT NAME:	CHEMICAL DESCRIPTION:	PRODUCT USE:	HAZARDOUS COMPONENT:
GBW-20C	Hemicellulase Breaker	Breaker - Water	None
ALPHA 1427		Biocide	Glutaraldehyde – CAS#000111-30-8 Quaternary ammonium chloride CAS# 007173-51-5 Alky dimethyl benzyl ammonium Chloride (C12-16) – CAS#068424-85-1 Ethanol – CAS# 000064-17-5 Water – CAS# 007732-18-5
FRAC SAND	Silica Sand (various Mesh sizes)	Proppant	Crystalline silica (quartz) CAS# 14808-60-7
S-8C, Sand	Silica Sand (100 mesh)	Sand	Silica – CAS# 14808-60-7
GW-3LDF		Gellant - Water	Petroleum Distillate Blend – Proprietary, (Not Associated with Diesel Fuel) Guar gum – CAS# 009000-30-0
FRW-18		Friction Reducer	Hydrotreated light distillate CAS# 064742-47-8
Scaletrol		Scale Inhibitor	Ethylene glycol – CAS# 000107-21-1 Diethylene glycol – CAS# 000111-46-6

WEST VIRGINIA COUNTY MAP



Hansen Well Site
Site Design, Construction Plan, &
Erosion and Sediment Control Plans
Tug Hill Operating
Marshall County
Franklin District
Latitude 39.72679283°
Longitude -80.81426073°
Haynes Run - Ohio River Watershed

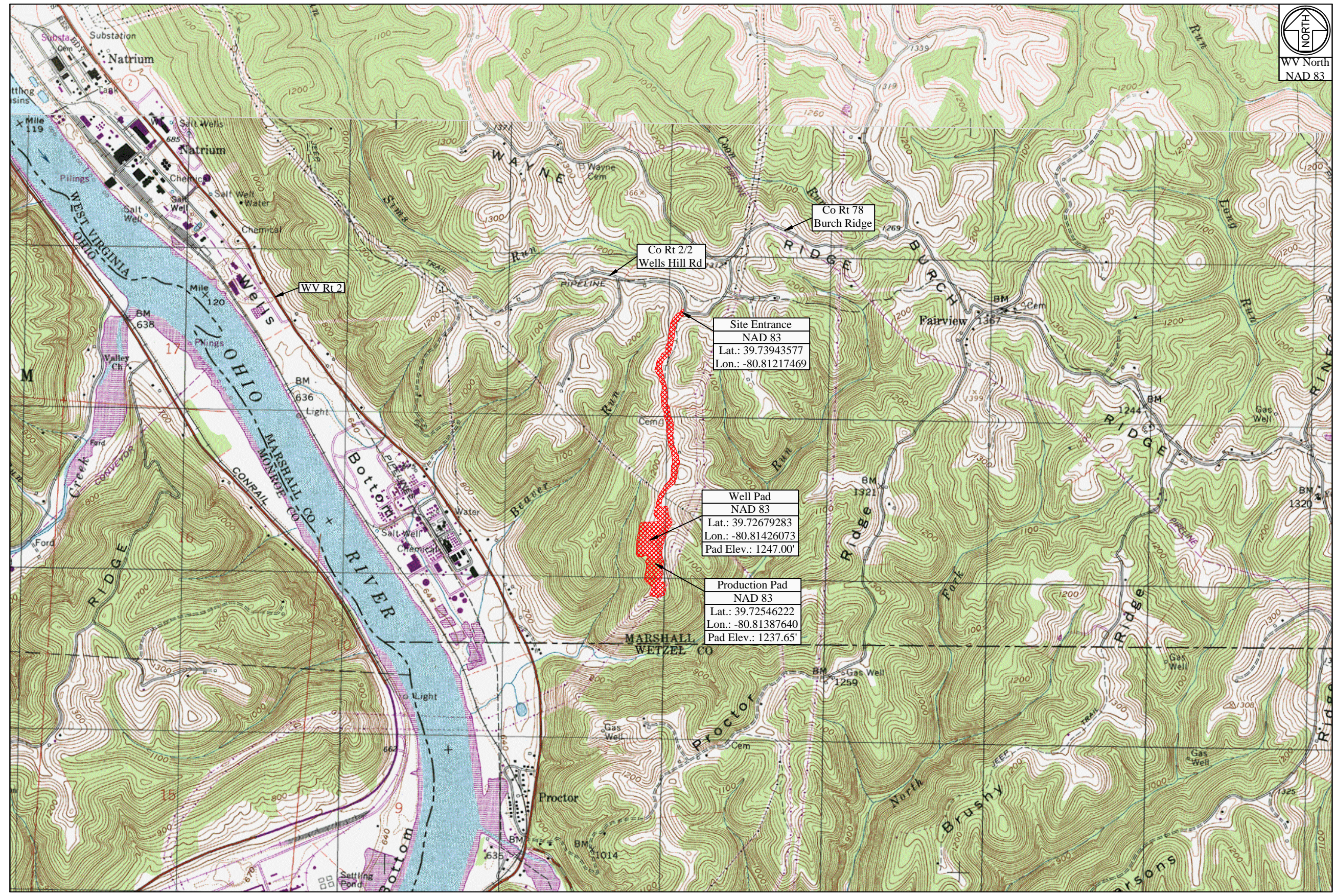
Pertinent Site Information
Hansen Well Site
Emergency Number: 304-845-1920
Franklin District, Marshall County, WV
Watershed: Haynes Run - Ohio River Watershed
Tug Hill Contact Number: 1-817-632-3400

Exhibit A: Final Design: Issue for Permitting

Table with 3 columns: Site Entrance, Center of Well Pad, Center of Production Pad. Includes coordinates and UTM values for various Hansen wells (9H, 6HU, 7HU, 8HU, 5H, 4HU, 3HU, 2HU, 1H).

Well Table with 5 columns: Hansen 1H, Hansen 2HU, Hansen 3HU, Hansen 4HU, Hansen 5H. Includes coordinates and UTM values for each well.

Well Table with 5 columns: Hansen 6HU, Hansen 7HU, Hansen 8HU, Hansen 9H. Includes coordinates and UTM values for each well.



WV State Plane Coordinate System
North Zone, NAD 83
Elevations Based on NAV88
Established By Survey Grade GPS
and OPUS Post-Processing

Table: Access Road. Columns: Surface Owner, TM - Parcel, Road Length, Type. Lists access roads for Covestro, LLC.

Table: Disturbed Area. Columns: Area Type, Area. Lists disturbed areas for Well Pad Construction, Production Pad Construction, etc.

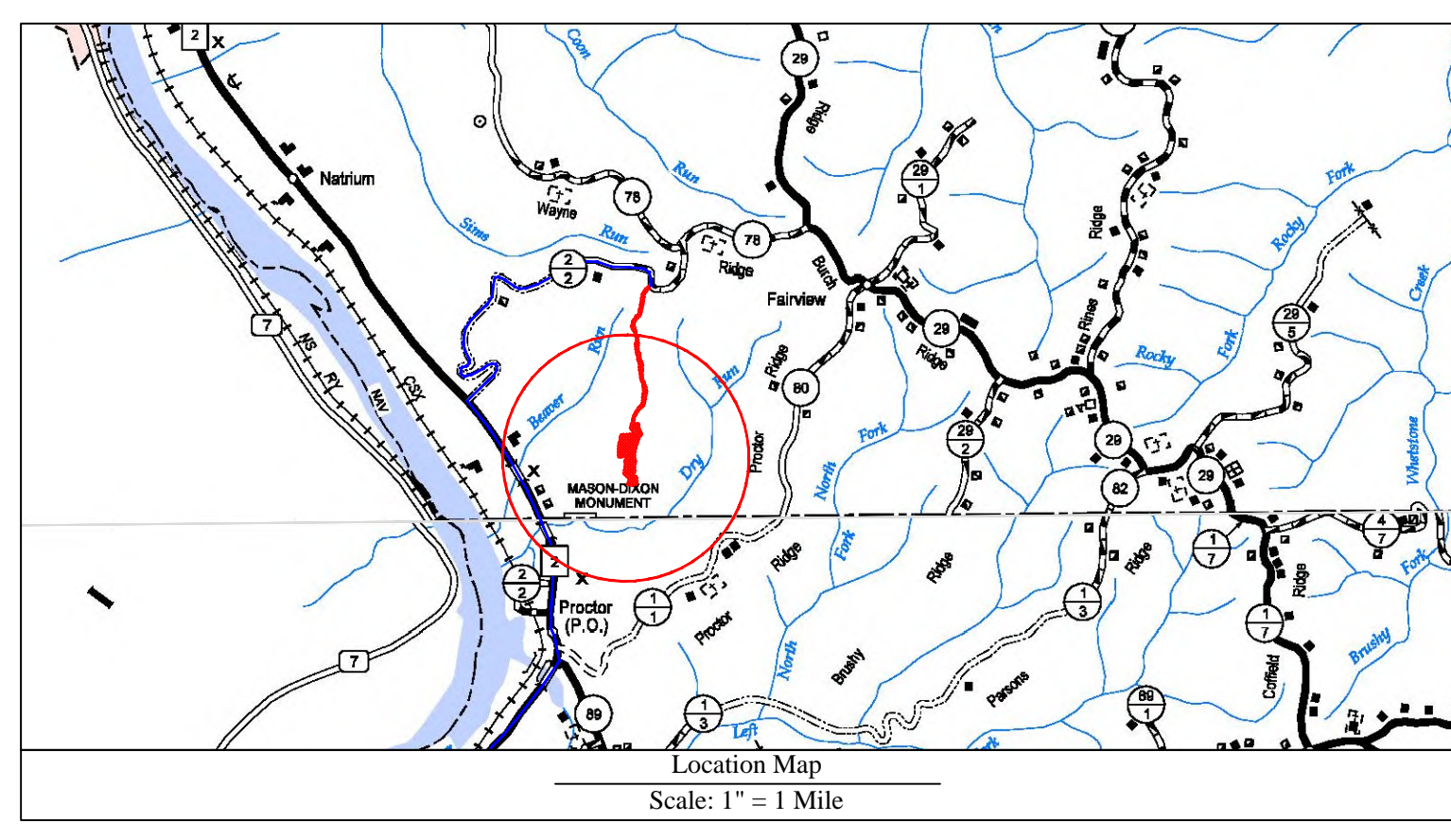
Table: Hansen Well Site Quantities. Columns: Description, Cut (CY), Fill (CY), Spoil (CY), Borrow (CY), Max. Slope, Length of Slope. Lists quantities for Well Pad, Production Pad, Access Road, etc.

Project Contacts
Tug Hill Operating: Jonathan White - Regulatory Analyst, Geoff Radler - V.P. Production
Survey and Engineer: Kenneth Kelly, John P. See, Zachary Summerfield

Well Location Restrictions
All Pad construction complies with the following restrictions.
*250' from an existing well or developed spring used for human or domestic animals.
*625' from an occupied dwelling or barn greater than 2,500 SF used for poultry or dairy measured from the center of the pad.
*100' from the edge of disturbance to wetlands, perennial streams, natural or artificial lake, pond or reservoir.
*300' from the edge of disturbance to a naturally reproducing trout stream.
*1,000' of a surface or ground water intake to a public water supply.

Approach Routes:
From the intersection of WV Rt 2 and OH Rt 7 near New Martinsville, WV. Travel North on WV Rt 2 for 6.1 mi. Turn Right onto Co Rt 2 (Wells Hill Rd). Follow Co Rt 2 for 2.0 mi. The site entrance will be on the Right (South) side of the road.

Table: Site Locations (NAD 27) and Site Locations (NAD 83). Columns: Structure, Latitude (DD), Longitude (DD).



Design Certification
The drawings, construction notes and reference diagrams attached hereto have been prepared in accordance with the West Virginia Code of State Rules, Division of Environmental Protection, Office of Oil and Gas, 39CSR30.
Zachary C. Summerfield
RPE 22214
Kelly Surveying PLLC
CO# 004232-09

Table: Sheet and Description. Lists sheet numbers (1, V1, N1-N4, etc.) and their corresponding descriptions (Cover Sheet, Schedule of Quantities, etc.).

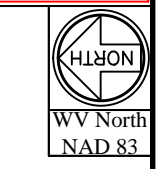
MISS UTILITY OF WEST VIRGINIA
1-800-245-4848
West Virginia State Law
Section XIV, Chapter 24-C requires that you call two business days before you dig in the state of West Virginia.
IT'S THE LAW
Know what's below. Call before you dig.

Floodplain Conditions
Do site construction activities take place in a floodplain: NO
Permit needed from county floodplain coordinator: NO
Flood Hazard Zone: X
HEC-RAS Study completed: N/A
Floodplain shown on drawings: N/A
FIRM Map Number(s) for site: 54051C 0205E
Acreages of construction in floodplain: N/A

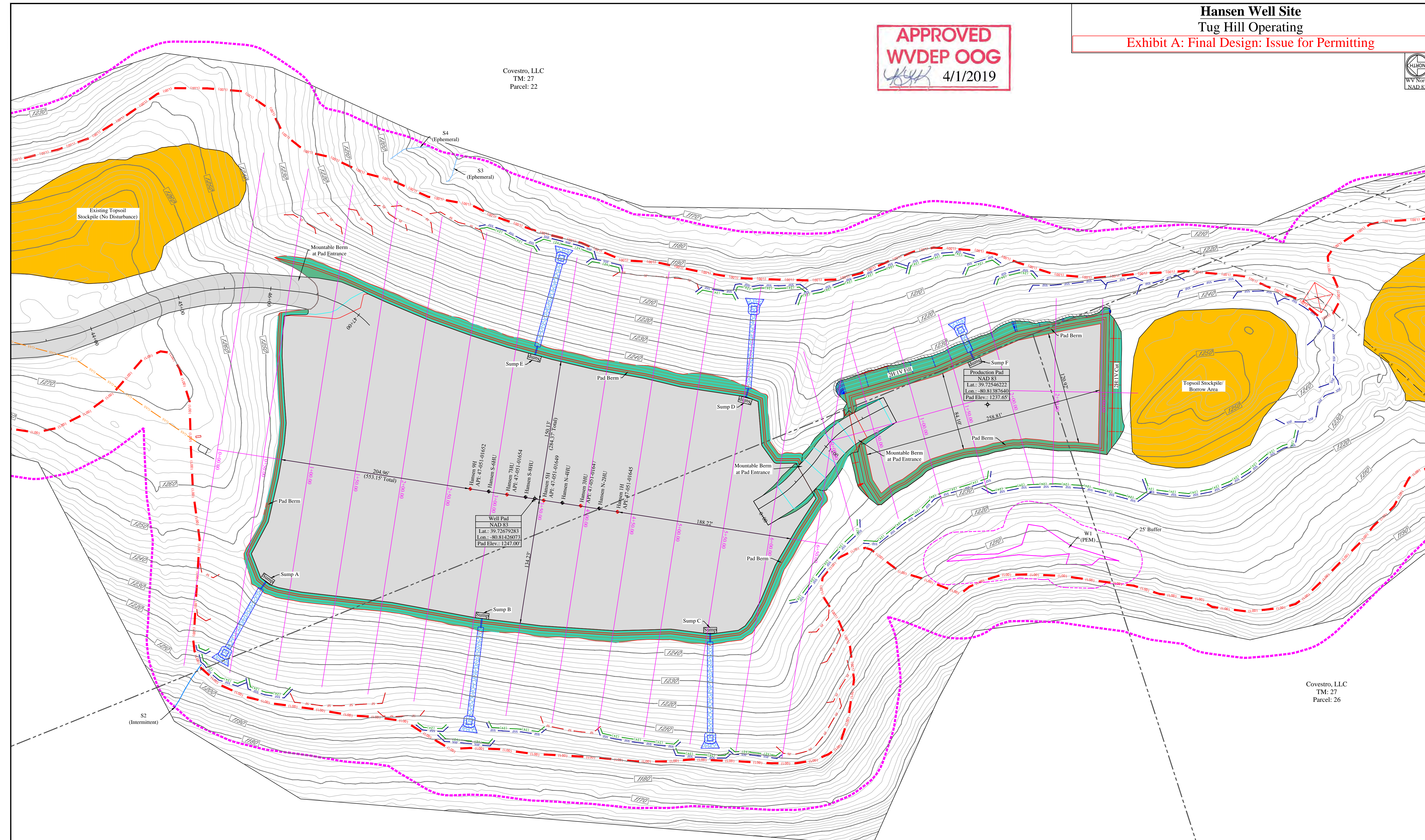
The WV Mines Website was consulted. Previous (Current) mining activities are not within the AOI.
WVDEP Website files show that there are active and/or abandoned gas wells within the AOI

Vertical sidebar containing: Revision/Design table, Date 01-20-2019, TUG HILL OPERATING logo, THIS DOCUMENT PREPARED FOR TUG HILL OPERATING, Kelly Surveying logo, Cover Sheet Hansen Well Site Franklin District Marshall County, WV, Date: 01/20/2019, Scale: As Shown, Designed By: ZS, File No., Sheet 1 of 17.

APPROVED
WVDEP OOG
4/1/2019



Covestro, LLC
TM: 27
Parcel: 22

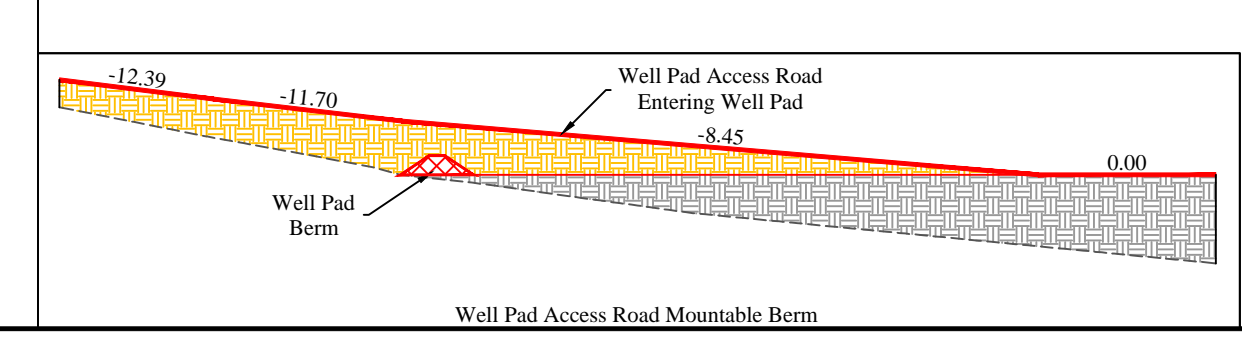
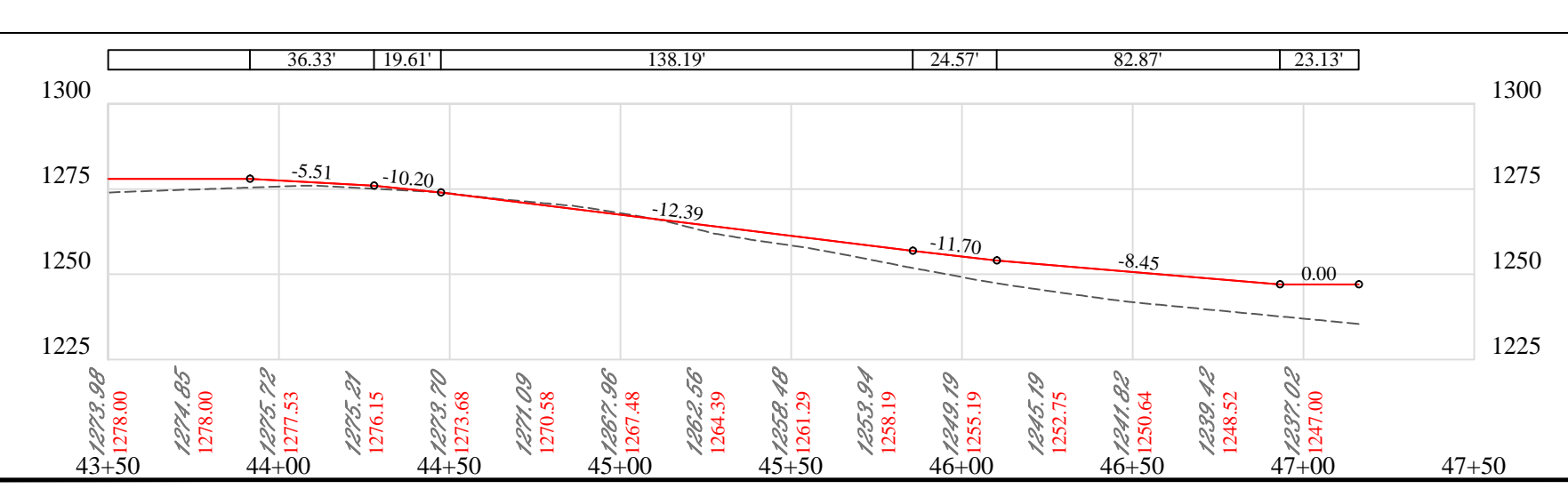


Well Pad
NAD 83
Lat.: -80.81426073
Lon.: -80.81387640
Pad Elev.: 1247.00'

Production Pad
NAD 83
Lat.: -80.81387640
Lon.: -80.81387640
Pad Elev.: 1237.65'

Covestro, LLC
TM: 27
Parcel: 21

Covestro, LLC
TM: 27
Parcel: 26



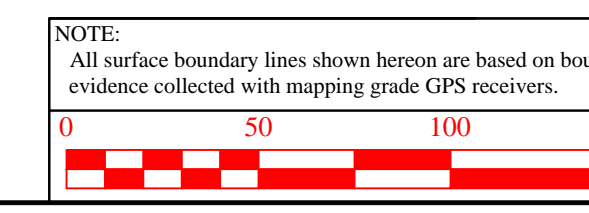
Access Road			
Surface Owner	TM - Parcel	Road Length	Type
Covestro, LLC	28-9	1,065.55'	Access Road
Covestro, LLC	28-8	966.56'	Access Road
Covestro, LLC	27-22	2,684.23'	Access Road
Covestro, LLC	27-21	180.38'	Access Road

Disturbed Area	
Well Pad Construction	6.22 Ac
Production Pad Construction	0.91 Ac
Access Road Construction	5.48 Ac
Topsoil / Excess Material	2.13 Ac
Additional Clearing	13.54 Ac
Total Disturbed Area	28.28 Ac

Additional Information	
Total Wooded Acres Disturbed	0.00 Ac
Total Linear Feet of Access Road	4,896.56'

Legend

- Original Ground 2' Contour
- Original Ground 10' Contour
- Design 2' Contour
- Design 10' Contour
- Center of Structure
- 3" Silt Fence
- 24" Compost Filter Sock
- Super Silt Fence
- Limits of Disturbance
- Area of Interest
- Existing Gas Line
- Existing Utility Pole Line
- Property Line
- PEM Wetland
- POW Wetland
- Super Silt Fence
- PSS Wetland
- Perennial Stream
- Intermittent Stream
- Ephemeral Stream
- Toe Key
- Erosion Control Blanket Slope Area



NOTE: All surface boundary lines shown hereon are based on boundary evidence collected with mapping grade GPS receivers.

Revision	Date
Design	01-20-2019



THIS DOCUMENT PREPARED FOR TUG HILL OPERATING



Hansen Well Site
Franklin District
Marshall County, WV